COOPERATIVE EXTENSION SERVICE

HOME, YARD & GARDEN PEST NEWSLETTER

college of agricultural, consumer and environmental sciences, university of illinois at urbana-champaign ▲ illinois natural history survey, champaign

No. 1 • April 16, 1997

This is the first of 22 issues of the Home, Yard and Garden Pest Newsletter. *It will be prepared by Extension specialists in plant pathology, agricultural entomology, horticulture, and agricultural engineering. Timely, short paragraphs about pests of the home and its surroundings will make up the newsletter. When control measures are given, both chemical and nonchemical suggestions (when effective) will be given.*

Welcome

Welcome to the first issue of the 1997 *Home, Yard and Garden Pest Newsletter.* The newsletter reports on the appearance and management of diseases, weeds, and insect pests of turfgrass and ornamental plants in Illinois to the professional landscape maintainer, arborist, lawn care specialist, golf course superintendent, sod grower, nurseryman, and garden center operator. Management methods and suggested pesticides will primarily be those appropriate for the professional rather than the homeowner. Many times, however, the methods will be appropriate for homeowner use.

We will publish 22 issues, most of which will be four pages long, with an occasional longer issue. Issues will be published biweekly during April, weekly during May, June, and July, and then biweekly again during August and September. There will also be an issue near the end of October and another near the end of November. All issues are published on a schedule to coincide with pest management needs. We welcome input concerning the newsletter. Let us know what you like or dislike about our newsletter and give suggestions on how it could be better. With only a few authors for our articles, it is difficult for us to see or hear about every pest problem that develops throughout Illinois. If you see something unusual—either in the fact or in the timing of its occurrence—let one of the authors know or contact Phil Nixon, the newsletter coordinator, at (217) 333-6650. If you wish to discuss a specific article in the newsletter, contact the author whose name appears in parentheses at the end of the article. The author's telephone number will usually be listed at the end of the newsletter. *(Phil Nixon)*

PLANT DISEASES

Plant Clinic Opens May 1

The plant clinic serves as a clearinghouse for plant problems sent to the University of Illinois. Diagnosis is provided for trees, shrubs, turf, fruit, vegetables, field crops, and almost any other type of plant you can imagine. Specialists are called to help with diagnoses as needed; in an average year, about 20 different specialists may provide input on plant samples. Plant clinic services include plant and insect identification; diagnosis of disease, insect, weed, and chemical injury (chemical residue testing is not available); nematode assays; and help with nutrient-related problems, as well as management recommendations involving these diagnoses.

The University of Illinois Plant Clinic is open May 1 through September 12, 1997. Much of the operation of the clinic is supported by user fees. These fees, which have not increased since last year, are listed below. A check (payable to the University of Illinois) should accompany each sample.

General diagnosis (including cultures)	$10
Specialty tests (SCN, PWN, ELISA)*	$15
Other nematodes (usually corn)	$30

*SCN indicates the test for soybean cyst nematode. PWN indicates pinewood nematode analysis. ELISA is a technique used to test for various viral pathogens.

A specimen data form, or equivalent information, should always accompany a plant sample. The ability

to provide a thorough diagnosis is directly related to the quality of the sample and the type of information provided. (As the saying goes, "garbage in—garbage out.") Each Cooperative Extension Service unit office should have a copy of the specimen data form. Photocopy these as needed. You can also find the form in the *Master Gardener Manual* at the end of the disease section (or the end of the IPM section, depending on your version).

When submitting plant samples, prepare them to survive a rough ride in a very hot mail truck. When sending whole plants, wrap them as you would if you intended them to be planted. Wrap soil and roots in plastic to retain moisture and to keep soil off the foliage. Do not wrap foliage in plastic. If only leaves are sent, place them between cardboard and keep them dry. We can always rehydrate dry material at the clinic, but it is not possible to remove mold from rotted tissue. Send as much of the plant as possible—affected as well as healthy tissue—and carefully label the sample. A photograph of the plant and surrounding area is always helpful.

When in doubt about how to package a sample or what to send, call the clinic at (217) 333-0519. The mailing address is Plant Clinic, 1401 West St. Mary's Road, Urbana, IL 61802. Business hours are 8:00 a.m. to noon and 1:00 to 4:30 p.m., weekdays only. Arrangements can be made to drop off samples at other times. *(Nancy Pataky)*

Sphaeropsis Blight of Pine (formerly Diplodia Blight)

This disease of pine has been quite devastating the last several years. The fungal pathogen thrives in cool, wet weather and often invades injured wood. We have experienced lengthy, cool, and wet spring weather for the past two years, and winter freeze-thaws have been common. Ideal weather conditions, plenty of fungal inoculum, and susceptible pines have set the stage for Sphaeropsis blight. We see most problems on Austrian and Scotch pines, but other pines are susceptible. The disease may even occur on some fir and spruce species.

The fungus (*Sphaeropsis sapinea*) infects young, healthy, unwounded needles of new candles (new growth), which is where we see the typical blighting of branch tips. All needles in the terminal 6 inches or so of growth turn brown and dry out. This phase of the disease is unsightly but does not cause branch death. Usually the tree develops new growth below the dead area and results in crooked-looking branches so typical of Austrian pine. The fungus may, however, also infect the twigs of trees weakened by stress (such as drought, compacted soil, root injury, hail, or winter injury). Cankers develop on the twigs, usually causing noticeable sap exudate at the canker. When the canker girdles the twig, tissue beyond that point dies. In the last two or three years, we have seen an increase of Sphaeropsis twig blight at the clinic.

This disease is difficult to control. In fact, even the best efforts do not always give 100 percent satisfactory results. The first step is to recognize the disease. Look for black pinhead-sized fruiting bodies of the fungus in the brown needles at the tips of branches. The combination of tip blighting and these fruiting bodies is probably enough evidence to suspect Sphaeropsis blight. If necessary, laboratory confirmation is quick and easy.

Next, remove all dead wood (or as much as possible) from the tree. This is best done in the dormant season but can be done at other times when the foliage is dry. Cones are the next target for control. You will find hundreds of the black fruiting bodies of this fungus on cones, which serve as a major overwintering site. Remove cones from the tree and the surrounding ground.

We don't always advocate fungicide sprays for disease control, but in this case chemicals are necessary for near-complete control. Three sprays are recommended: one at budbreak (very soon now), one at half-candle elongation (about 10 to 14 days after the first spray), and another at 10 to 14 days after the second spray. Chemical options are listed in the *1997 Illinois Commercial Landscape and Turf Pest Management Handbook.* University of Illinois Grounds Department personnel have dealt with this disease and have tried many chemicals. They have had the best luck with Cleary 3336. This is not a scientific evaluation but an observation of success. A product containing the same active ingredient and packaged for homeowner use is called Ferti-lome Halt systemic. For more details about this disease, consult *Report on Plant Diseases* No. 625, a fact sheet available through the Crop Sciences Department, Plant Pathology Extension. *(Nancy Pataky)*

HORTICULTURE

Spring Cleanup and Preparation Tips

This has been a long, cold winter but spring is just around the corner. Regardless of the amount of cleanup you did last fall, some spring cleanup, pruning, and preparation is needed.

Pruning Raspberries: Spring pruning of red and yellow raspberries should be done before the buds begin to swell. All short and weak canes should be removed and the vigorous canes should be thinned so they are 4 to 8 inches apart. Only the largest canes should be saved. Cut the canes back to 3 or 4 feet. The canes of everbearing varieties should be topped back if they were not pruned after last fall's harvest.

Strawberries: On mulched strawberries, remove part of the straw as the new growth starts. Remove the excess and leave some of the straw between the rows. Do not fertilize until after harvest is complete and the patch is renewed.

Blueberries: Blueberry plants should be pruned before the new growth begins. Remove dead or injured branches as well as any short, stubby branches near the ground. It is important to remove some of the older branches to allow younger, vigorous branches to develop. If the plants have an unusual load of fruit buds, the tips of the branches can be cut back to 4 to 6 fruit buds. The fruit buds are large, round, and plump; the leaf buds are smaller, thinner, and sharply pointed. Cutting the fruiting branches reduces yields slightly, but the berries will be larger.

Roses: Remove the covering (soil, leaves, cones) on roses that were protected for the winter. Clean up the rose beds by removing any leaves and debris that could carry disease from one season to the next. While the plants are dormant and the weather has moderated, prune them to improve health, appearance, and productivity. Begin by removing all dead, damaged, and blackened wood. Cut down to healthy wood, just above a leaf bud. Remove any crossing branches, twiggy growth, or side growth. Take out old wood at the bud union and leave 3 to 5 evenly distributed canes. Do not mulch at this time; a mulch will keep the soil cool and slow the growth of the bushes. buds. Do not prune back material until the buds start to grow. Once new growth appears, prune dead material back to the new growth, bud, or a branch. *(Jim Schmidt and Rhonda Ferree)*

INSECTS

Phil and John Have Moved

John Lloyd and Phil Nixon, Extension entomologists in the Department of Natural Resources and Environmental Sciences, have moved to 103A and 103B Vegetable Crops Building, respectively. This move puts them in better proximity to other Extension colleagues in the department. If you have the opportunity to stop by, feel free to do so. Their new mailing address is Department of Natural Resources and Environmental Sciences, University of Illinois at Urbana-Champaign, 103 Vegetable Crops Building, 1103 South Dorner Drive, Urbana IL 61801.

Tom Royer in Oklahoma

Tom Royer, former Extension entomologist at the Edwardsville Extension Center, has moved south to a position as assistant professor in the Department of Entomology at Oklahoma State University. We will certainly miss Tom's contributions to the Urban IPM program and his numerous columns in this newsletter. We already noticed a twinge of an Oklahoma accent in his last e-mail. We wish him all the best in his new position.

Multicolored Asian Ladybird Beetle

This home invader is once again becoming a nuisance this spring as the weather warms. Adult multicolored Asian ladybird beetles vary in color—as their name suggests—from pale yellow-orange to bright red.

ılly have 17 spots on their elytra (shell), but
; as well. The multicolored Asian ladybird
s introduced into the United States to assist
ling soft-bodied insects such as aphids and
es. It was fairly successful and has adapted
/ing and reproducing in the United States.
ıe unknown impact this beetle is having on
lybird beetle populations, it tends to be a
for homeowners because of its overwinter-
;.

:etles overwinter in cliff faces in their native
owever, the closest thing we have to cliffs in
ıd northern Illinois are buildings. If founda-
ing, and screens are in good repair, then most

to provide a thorough diagnosis is directly related to the quality of the sample and the type of information provided. (As the saying goes, "garbage in—garbage out.") Each Cooperative Extension Service unit office should have a copy of the specimen data form. Photocopy these as needed. You can also find the form in the *Master Gardener Manual* at the end of the disease section (or the end of the IPM section, depending on your version).

When submitting plant samples, prepare them to survive a rough ride in a very hot mail truck. When sending whole plants, wrap them as you would if you intended them to be planted. Wrap soil and roots in plastic to retain moisture and to keep soil off the foliage. Do not wrap foliage in plastic. If only leaves are sent, place them between cardboard and keep them dry. We can always rehydrate dry material at the clinic, but it is not possible to remove mold from rotted tissue. Send as much of the plant as possible—affected as well as healthy tissue—and carefully label the sample. A photograph of the plant and surrounding area is always helpful.

When in doubt about how to package a sample or what to send, call the clinic at (217) 333-0519. The mailing address is Plant Clinic, 1401 West St. Mary's Road, Urbana, IL 61802. Business hours are 8:00 a.m. to noon and 1:00 to 4:30 p.m., weekdays only. Arrangements can be made to drop off samples at other times. *(Nancy Pataky)*

Sphaeropsis Blight of Pine (formerly Diplodia Blight)

This disease of pine has been quite devastating the last several years. The fungal pathogen thrives in cool, wet weather and often invades injured wood. We have experienced lengthy, cool, and wet spring weather for the past two years, and winter freeze-thaws have been common. Ideal weather conditions, plenty of fu inoculum, and susceptible pines have set the sta Sphaeropsis blight. We see most problems on A and Scotch pines, but other pines are susceptible disease may even occur on some fir and spruce species.

The fungus (*Sphaeropsis sapinea*) infects you healthy, unwounded needles of new candles (nev growth), which is where we see the typical bligh of branch tips. All needles in the terminal 6 inch so of growth turn brown and dry out. This phase the disease is unsightly but does not cause brancl death. Usually the tree develops new growth belc the dead area and results in crooked-looking brar so typical of Austrian pine. The fungus may, how also infect the twigs of trees weakened by stress (such as drought, compacted soil, root injury, hail, or winter injury). Cankers develop on the twigs, usually causing noticeable sap exudate at the canker. When the canker girdles the twig, tissue beyond that point dies. In the last two or three years, we have seen an increase of Sphaeropsis twig blight at the clinic.

This disease is difficult to control. In fact, even the best efforts do not always give 100 percent satisfactory results. The first step is to recognize the disease. Look for black pinhead-sized fruiting bodies of the fungus in the brown needles at the tips of branches. The combination of tip blighting and these fruiting bodies is probably enough evidence to suspect Sphaeropsis blight. If necessary, laboratory confirmation is quick and easy.

Next, remove all dead wood (or as much as possible) from the tree. This is best done in the dormant season but can be done at other times when the foliage is dry. Cones are the next target for control. You will find hundreds of the black fruiting bodies of this fungus on cones, which serve as a major overwintering site. Remove cones from the tree and the surrounding ground.

We don't always advocate fungicide sprays for disease control, but in this case chemicals are necessary for near-complete control. Three sprays are recommended: one at budbreak (very soon now), one at half-candle elongation (about 10 to 14 days after the first spray), and another at 10 to 14 days after the second spray. Chemical options are listed in the *1997 Illinois Commercial Landscape and Turf Pest Management Handbook.* University of Illinois Grounds Department personnel have dealt with this disease and have tried many chemicals. They have had the best luck with Cleary 3336. This is not a scientific evaluation but an observation of success. A product contain

Pruning Raspberries: Spring pruning of red and yellow raspberries should be done before the buds begin to swell. All short and weak canes should be removed and the vigorous canes should be thinned so they are 4 to 8 inches apart. Only the largest canes should be saved. Cut the canes back to 3 or 4 feet. The canes of everbearing varieties should be topped back if they were not pruned after last fall's harvest.

Strawberries: On mulched strawberries, remove part of the straw as the new growth starts. Remove the excess and leave some of the straw between the rows. Do not fertilize until after harvest is complete and the patch is renewed.

Blueberries: Blueberry plants should be pruned before the new growth begins. Remove dead or injured branches as well as any short, stubby branches near the ground. It is important to remove some of the older branches to allow younger, vigorous branches to develop. If the plants have an unusual load of fruit buds, the tips of the branches can be cut back to 4 to 6 fruit buds. The fruit buds are large, round, and plump; the leaf buds are smaller, thinner, and sharply pointed. Cutting the fruiting branches reduces yields slightly, but the berries will be larger.

Roses: Remove the covering (soil, leaves, cones) on roses that were protected for the winter. Clean up the rose beds by removing any leaves and debris that could carry disease from one season to the next. While the plants are dormant and the weather has moderated, prune them to improve health, appearance, and productivity. Begin by removing all dead, damaged, and blackened wood. Cut down to healthy wood, just above a leaf bud. Remove any crossing branches, twiggy growth, or side growth. Take out old wood at the bud union and leave 3 to 5 evenly distributed canes. Do not mulch at this time; a mulch will keep the soil cool and slow the growth of the bushes.

Perennial Flowers: This is also the time to carefully remove any mulch that was placed around perennials to protect them. Don't be alarmed if no new growth is evident; many plants are slow to emerge in the spring. Unprotected plants or those sensitive to temperature extremes may have damage to the crowns or the plants may have "heaved" from alternate freezing and thawing. Before removing any plants, wait for temperatures to warm to see if any growth appears.

Woody Ornamental Winter Injury: Some plants are showing winter injury, particularly evergreens. Use a wait-and-see approach. Regardless of the amount of injury showing, most plants have viable buds. Do not prune back material until the buds start to grow. Once new growth appears, prune dead material back to the new growth, bud, or a branch. *(Jim Schmidt and Rhonda Ferree)*

INSECTS

Phil and John Have Moved

John Lloyd and Phil Nixon, Extension entomologists in the Department of Natural Resources and Environmental Sciences, have moved to 103A and 103B Vegetable Crops Building, respectively. This move puts them in better proximity to other Extension colleagues in the department. If you have the opportunity to stop by, feel free to do so. Their new mailing address is Department of Natural Resources and Environmental Sciences, University of Illinois at Urbana-Champaign, 103 Vegetable Crops Building, 1103 South Dorner Drive, Urbana IL 61801.

Tom Royer in Oklahoma

Tom Royer, former Extension entomologist at the Edwardsville Extension Center, has moved south to a position as assistant professor in the Department of Entomology at Oklahoma State University. We will certainly miss Tom's contributions to the Urban IPM program and his numerous columns in this newsletter. We already noticed a twinge of an Oklahoma accent in his last e-mail. We wish him all the best in his new position.

Multicolored Asian Ladybird Beetle

This home invader is once again becoming a nuisance this spring as the weather warms. Adult multicolored Asian ladybird beetles vary in color—as their name suggests—from pale yellow-orange to bright red. They usually have 17 spots on their elytra (shell), but this varies as well. The multicolored Asian ladybird beetle was introduced into the United States to assist in controlling soft-bodied insects such as aphids and some scales. It was fairly successful and has adapted well to living and reproducing in the United States. Besides the unknown impact this beetle is having on native ladybird beetle populations, it tends to be a nuisance for homeowners because of its overwintering habits.

The beetles overwinter in cliff faces in their native habitat; however, the closest thing we have to cliffs in central and northern Illinois are buildings. If foundations, siding, and screens are in good repair, then most

beetles looking for hiding places in the fall will remain outdoors. However, if gaps exist in the perimeter defense of a building, many homeowners will have to deal with these unwanted guests.

As temperatures cool, the metabolism of the ladybird beetles slows down and they become inactive. When we have a period of continuous warm, sunny days, their metabolism begins to increase, and they once again become active. It is during this time when most homeowners come in contact with ladybird beetles indoors, looking for a way to get out.

Ladybird beetles feed only on soft-bodied insects. They will not damage anything indoors and can be safely removed by vacuuming. Captured beetles can be released outdoors, or can be drowned in a pail of soapy water. We do not recommend the use of insecticides to control overwintering ladybird beetles.

Buildings that had large populations of beetles overwinter indoors should be examined during the summer, and all screens, cracks in the foundation, and gaps in the siding should be fixed to prevent the influx again in the fall. *(John Lloyd)*

Scouting Report

Dormant oil spray can still be applied to most trees in northern Illinois and to some trees in other parts of the state. This pesticide, which works by covering and suffocating exposed insects, is applied to control overwintering aphid eggs and most scale insects. It is not effective on scales that overwinter at least partially as eggs, such as oystershell scale and pine needle scale. The dormant oil spray is applied when temperatures will be above 32°F (40°F for evergreens) for 24 hours after application. This allows the oil to evaporate rather than soak into the plant and cause damage. Do not apply to Japanese or sugar maple. It will take the blue color off Colorado blue spruce.

Eastern tent caterpillar and European pine sawfly should be hatching in southern and central Illinois. Acephate (Orthene), carbaryl (Sevin), and chlorpyrifos (Dursban) are among the many insecticides effective against these insects. *Bacillus thuringiensis kurstaki,* sold as Dipel, Thuricide, and other trade names, is an effective and highly recommended control for Eastern tent caterpillar. It is ineffective against sawflies because they are wasp larvae, not caterpillars.

The blooming of *Magnolia* X *soulangiana,* saucer magnolia, is associated with several occurrences in insect activity, according to Don Orton in the book *Coincide*. This excellent book is inexpensive (about $20) and should be on the shelf of every professional involved in the management of insect pests on ornamental trees and shrubs. Saucer magnolia was in full bloom during the week of April 6 in central Illinois. Refer to the *1997 Illinois Commercial Landscape and Turf Pest Management Handbook* for suggested controls.

Cooley and eastern spruce gall adelgids are active and controllable on warm days when saucer magnolia is in pink bud. Once blooming occurs, control will not be effective on spruce, although control on Douglas-fir is possible throughout the growing season. Zimmerman pine moth larvae are active at early bloom of saucer magnolia and can be controlled with applications of chlorpyrifos (Dursban) or dimethoate (Cygon).

Cankerworms hatch during bloom of saucer magnolia and may be common on elm, hackberry, honey locust, maple, and other trees. Sprays of *Bacillus thuringiensis kurstaki* (Dipel, Thuricide) are very effective, as are other insecticides. This insect is not as common in Illinois as it was before Dutch elm disease eliminated most of the American elms. The cankerworm has been numerous in some areas of northeastern Illinois for the last several years.

Ash plant bug adults overwinter and become active on ash during the late bloom of saucer magnolia. They can be controlled with sprays of acephate (Orthene), insecticidal soap, and pyrethroids such as bifenthrin (Talstar) and cyfluthrin (Tempo). Treating now will prevent the stippling and leaf distortion caused by this insect on ash leaves. *(Phil Nixon and John Lloyd)*

Home, Yard and Garden Pest Newsletter *is prepared by Extension specialists from the University of Illinois at Urbana-Champaign and the Illinois Natural History Survey. Information for this newsletter is gathered with the help of staff members, Extension field staff, and others in cooperation with the USDA Animal and Health Inspection Service.*

Major authors are Phil Nixon and John Lloyd, (217) 333-6650, and Fredric Miller, (708) 352-0109, entomologists; Nancy Pataky, plant pathologist, (217) 333-0519; and Rhonda Ferree, Tom Voigt, and David Williams, horticulturists, (217) 333-0350. Phil Nixon is the executive editor of the Home, Yard and Garden Pest Newsletter. *This newsletter is written by faculty in the Department of Natural Resources and Environmental Sciences and the Department of Crop Sciences. The newsletter is edited by Peggy Currid, typeset by Oneda VanDyke, and proofread by Herbert Morgan, all of Information Services.*

COOPERATIVE EXTENSION SERVICE

HOME, YARD & GARDEN PEST NEWSLETTER

college of agricultural, consumer and environmental sciences, university of illinois at urbana-champaign ▲ illinois natural history survey, champaign

No. 2 • April 30, 1997

This newsletter is issued weekly (biweekly in the early spring and late summer) to provide timely information on insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

INSECTS

1997 Illinois Woody Plant & Pest Diagnostic Workshop

The Illinois Arborist Association, in cooperation with the University of Illinois and the Morton Arboretum, is sponsoring a diagnostic workshop for professionals interested in learning how to diagnose plant problems. The workshop is scheduled for May 30 and 31 at the Morton Arboretum in Lisle, Illinois. Plant pathologists, entomologists, and horticulturists will instruct professionals in the diagnostic process and will provide hands-on experience with common, and not so common, Illinois plant and pest problems in the laboratory and the field. Hand lenses, pruning shears, and pocket knives are required. Rain gear is optional. Participants in this workshop will receive preference when registering for the 1997 Plant Health Care Workshop in Indianapolis. Contact Julie Ruffolo (630) 960-5922 to register for the diagnostic workshop. Space is limited, so register early. This workshop will provide ISA Certified Arborist CEUs. *(Phil Nixon)*

1997 Midwest Plant Health Care Workshop

The 1997 Midwest Plant Health Care Workshop is scheduled for July 11 and 12 in Indianapolis. This hands-on workshop is being hosted by the Indiana Arborist Association and Purdue University and is designed to assist professionals in developing and maintaining productive Plant Health Care (PHC) programs for residential and commercial/municipal properties. Dr. John Ball will lead discussions about using PHC in landscape situations. Outdoor field sessions with PHC and pest management experts from Indiana, Illinois, and Ohio will take participants through the process of mapping properties, diagnosing plant problems, interacting with property owners, and making management decisions using the Appropriate Response Process (ARP). Space is limited. Participants in Illinois, Indiana, Missouri, or Ohio diagnostic workshops will receive preference when registering. Contact Rita McKenzie at Purdue University (765) 494-3625 for registration information. This workshop will provide ISA Certified Arborist CEUs. *(Phil Nixon)*

Plant Clinic to Handle Insect IDs

All "urban" ornamental and structural insect specimens sent in to the University of Illinois will now be processed by the University of Illinois Plant Clinic. A $10 fee will be charged for this processing. This arrangement will better facilitate the response time and handling of specimens that were previously sent directly to specialists on campus. Samples will still be identified by the specialists, but records will be retained by the Plant Clinic. We sincerely appreciate the willingness of the Plant Clinic staff to assist us with this effort. *(John Lloyd and Phil Nixon)*

Eastern Tent Caterpillar

Traveling with an entomologist this time of year may be detrimental to your health. Extension entomologist Phil Nixon, who is the unrivaled Illinois champion window scouting surveyor, can spot eastern tent caterpillar tents from a distance of over 100 yards while driving 65 m.p.h (yeah, right!) with one hand on the wheel, a foot on the gas, and his camera with telephoto lens pointing out the open driver's side window.

ACES College of Agricultural, Consumer and Environmental Sciences, University of Illinois at Urbana-Champaign

Helping You Put Knowledge to Work—State • County • Local Groups
U.S. Department of Agriculture Cooperating
The Cooperative Extension Service provides equal opportunities in programs and employment.

While driving down I-57 south of Effingham, Phil counted approximately 15 tents per tree, which suggests we are likely to see some sizeable populations of this pest in the southern part of the state.

Tents of eastern tent caterpillar begin to form in branch crotches of infested trees each spring. The caterpillars leave the tents during the day to feed on new foliage and return in the evening to the protection of the tent. Small tents and caterpillars can be easily removed by hand in the evening on accessible plants. Severe infestations and hard-to-reach tents can be treated with *Bacillus thuringiensis kurstaki* (Dipel, Thuricide) to prevent further defoliation. Other insecticides listed in the *1997 Illinois Commercial Landscape and Turf Pest Management Handbook* will also effectively control this pest. Penetrating the tent with the compounds and treating adjacent foliage in the evening will help ensure control. Healthy plants defoliated by this caterpillar will refoliate later in the spring. *(John Lloyd)*

Pine Sawfly

Pine sawfly is present throughout the state, particularly on Scotch and mugo pine. Young larvae are one-eighth to one-quarter of an inch long and light gray to pale green with large black heads. They feed in a group on the needles. As they mature, the larvae get larger and develop a series of light- and dark-green stripes. Although these insects look like caterpillars, they are really wasp larvae and thus are not controlled by *Bacillus thuringiensis kurstaki* (Dipel, Thuricide). They can be controlled with a broad-spectrum insecticide such as carbaryl (Sevin) or chlorpyrifos (Dursban). *(Phil Nixon)*

Leafminers: Artists in Their Own Way

Leafminers are immature larvae of beetles, flies, wasps (sawflies), and moths. Once females lay eggs on the surface of host plants (sometimes directly in host plants), larvae will hatch and burrow into leaves and feed between the upper and lower leaf surfaces. Damage from leafminers is primarily aesthetic—only very heavy infestations are likely to affect tree health. Their feeding behavior will discolor leaves in one of two patterns: serpentine leaf mines or blotch leaf mines. Serpentine leaf mines are snakelike in appearance. On the other hand, blotch leaf mines are simply irregular blotches on the leaves. It is quite easy to determine if a leafminer is present. Hold the leaf up to a light source and look for the larva(e) and small excrement pellets. Many different leafminers occur in Illinois. Here are a few examples.

Birch leafminer (sawfly): Birch leafminer pupae overwinter in soil at the base of infested birch trees. Adult sawflies fly to leaves in early May, about one week after leaves unfold. Eggs are laid within young leaves. Larvae mine leaves for two to three weeks, until they chew a hole in the leaf and drop to the ground to pupate. There are three to four generations per year. Controlling the first generation (mid-May) will, for the most part, reduce not only this generation, but also subsequent generations throughout the summer. This leafminer is most damaging in northern Illinois.

Hawthorn leafminer (sawfly): Adults emerge in early May. Eggs hatch a few days after being laid within the leaves. At the end of May, larvae leave their mines and pupate within the soil. Overwintering also takes place in the soil. Hawthorn leafminers have only one generation per year. Controls should be applied around the first of May (caution: acephate may burn some varieties of hawthorn). As with the birch leafminers, monitor trees for adult activity as well as egg-laying scars on the leaves.

Locust leafminer (beetle): As temperatures begin to warm in the spring (May), overwintering adults become active, when feeding, mating, and laying eggs on new leaves takes place. Eggs will hatch in mid- to late May, with extensive mining visible during the first part of June. Unlike the other leafminers, locust leafminers pupate within leaves. Adults emerge and lay eggs. Locust leafminers have two generations per year. Insecticidal control is most effective against the adults. Make sure that the leafminers are not in the late larval stage or in the pupal stage because they are not readily susceptible to pesticides. This leafminer is most noticeable in southern Illinois.

Holly leafminer (fly): Holly leafminer larvae overwinter in leaf mines. Larvae then pupate in late March or early April. Adults emerge and lay eggs over a period of six weeks. A contact insecticide can be applied every ten days from early April through May to control the adults.

Oak leafminer (moth): Oak leafminer is primarily a late-season pest with mines first appearing in early summer. White and bur oaks are the most heavily attacked species, with several generations of caterpillars causing heavy aesthetic damage by the end of the growing season. Because this leafminer overwinters as pupae in fallen leaves, raking up and disposing of these leaves will reduce the infestation as long as any nearby forest areas are not infested. Sprays applied when new mines first appear will help reduce later damage.

Control of leafminers involves more than one type of management. First, keep trees properly watered and fertilized. Second, consider natural enemies when determining whether a pesticide should be implemented. Natural enemies are normally present and can easily find leafmining larvae. Round holes through the leaf surface over a mine or dead larvae in the mine are evidence of natural enemy attack. Third, systemic insecticides, such as acephate (Orthene), avermectin (Avid), and imidicloprid (Merit), are very effective against young leafminers. Always read and follow label directions when using pesticides. *(Corey K. Gerber, Purdue University, and Phil Nixon)*

PLANT DISEASE

What's New at the Plant Clinic for 1997?

There is one small yet significant change for those of you sending samples by mail. Urbana is now large enough that the postal service has split it into several zip codes. The Plant Clinic zip code is now 61802 rather than 61801.

A more exciting change is the connection of the clinic to the University fiber optics system. Our building is at the South Farms and had not been connected to the computer cable system on the main campus. Modems did not provide acceptable speed and were subject to frequent transmission problems. Now that the fiber optics line has been connected to the building, the Plant Clinic will soon be connected to computers for access to e-mail and the Internet. We will provide information about how this can speed up clinic responses to CES offices and others with e-mail addresses. We look forward to many other improvements through this new connection.

A final change is that all insect samples will now be processed by the clinic. This is not a big change for clinic staff because many insect samples were handled this way in the past. However, all insect samples will now be given a clinic number and all paperwork associated with those samples will be handled by the clinic. The entomology specialists who handled your samples in the past will be the same specialists who handle your samples now. The difference is that the samples will be opened, logged, and prepared for diagnosis even if your chosen entomologist is out of town. This process should speed up responses and will definitely save time for those specialists. As with any clinic samples, the same fees will be applied. *(Nancy Pataky)*

Turf Disease

We have received many inquiries about dead or yellow areas in turf. The most common concern is what can be sprayed on the lawn to stop the "disease." This is not an infectious disease and does not warrant any fungicide applications. Much of the yellowing of blades of turf or patches of yellow turf has been attributed to cold temperature injury. This is particularly true with tall fescue. As temperatures remain consistently warm, turf color should begin to improve.

The only infectious disease we have seen so far this year, and only in a few cases, is leaf spotting. The *Helminthosporium* types, or possibly *Curvularia*, are caused by fungi and result in leaf-spotting lesions. We tend to see these more readily in cool conditions on poor, compacted soils or in areas under stress. Rather than rush to apply a fungicide, follow these cultural practices:

- Fertilize to encourage moderate growth of the turf, but avoid high rates of nitrogen.
- If watering is necessary, apply in the morning to encourage drying of the blades before evening.
- Mow at the recommended height for the species. Closely mown lawns have more problems with leaf spots.
- Open up the area to air flow by pruning surrounding plants and avoiding dense plantings.
- Consider resistant turf grasses, which are readily available.

If fungicide control is determined to be necessary, consult pages 11 and 15 of the *1997 Illinois Commercial Landscape and Turf Pest Management Handbook* for recommended chemicals; see page 17 for turf RPDs. Chemical applications provide only temporary control of leaf spots. Cultural controls and use of resistant varieties will provide long-term control. Consult *Report on Plant Diseases* No. 405 for details about these diseases. *(Nancy Pataky)*

Cedar-Apple Rust Sporulation

Cedar-apple and related rusts are rust diseases caused by the *Gymnosporangium* spp. of fungi. They require two hosts to survive. Part of the fungal life cycle occurs on the cedar (actually a *Juniperus* species), and the remainder of the life cycle occurs on apple, crabapple, hawthorn, or quince. Galls form on the infected twigs of the cedar (actually red cedar or other junipers). In wet periods of spring, these galls produce spores that are blown to the broadleaf host, causing further infection. In late summer, the spores on the broadleaf host form and blow back to the juniper host.

This series of events, called the disease cycle, explains how the disease is perpetuated from season to season.

Juniper galls can be seen in winter and spring. They begin as dark brown galls and range from one-quarter to more than one inch in diameter. In spring, they develop orange to yellow horns or gelatinous tendrils that release rust spores. The galls and spore horns are conspicuous and often quickly gain the attention and concern of homeowners. Plant pathologists think they are pretty.

Juniper-quince rust forms more of a canker on the stems than an actual gall. (It may also cause bark cracking.) Still, these cankers will also become gelatinous. Spore horns on juniper galls have begun to show in central Illinois. The galls will dry down and re-swell with the weather, releasing six to eight crops of spores. If the juniper infection is fairly light, removal of the galls may help control the disease, especially if there are no other infected junipers nearby. Remove galls in dry weather. The rust diseases usually do not have much impact on the junipers, but preventing juniper infection will prevent further spread of the rust.

The best option for disease control is the use of resistant varieties. There are many crabapples and hawthorns with resistance. For established trees, fungicides may be necessary. Usually the broadleaf host is targeted. Many fungicide application instructions suggest initiating sprays when new growth begins. If you are able to use one of the sterol-inhibitor fungicides, sprays can be started when nearby apples are in the pink bud stage. A second spray with a sterol inhibitor should occur three weeks later. Protectant (contact) sprays would have to be applied more often, every seven to ten days being the usual recommendation. Because fungicide resistance may occur with the sterol inhibitors, a combination of sterol inhibitor and contact fungicide is best. Be certain to follow label directions carefully. Sprays should be continued until galls dry up for the final time—usually two to three weeks after petal fall. For more information on rust diseases of apple, crabapple, and hawthorn, consult *Report on Plant Diseases* No. 802. *(Nancy Pataky)*

Baking Soda as a Fungicide

Several years ago I reported in this newsletter that work was in progress to register a formulation of sodium bicarbonate as a fungicide. At that time, it was anticipated that this would occur within months! Recently there have been follow-up questions about the use of baking soda to prevent disease, and I promised to find out more about the topic.

First, any product we recommend to control a pest must be a registered pesticide. We cannot recommend a home remedy unless it bears a chemical registration and label, regardless of how safe we think it is. This is the law.

Research has shown that the use of sodium bicarbonate prevents some fungal diseases and that some of its relatives, potassium bicarbonate and potassium carbonate, also work when combined with sodium bicarbonate. The chemical must be applied in such a way that it can be spread over the plant. In other words, it needs a carrier. The active ingredient and carrier must be safe and must also pass the same tests that any fungicide must pass to ensure that the entire product is safe to apply to plants. Therein lies the rub. My digging so far has found that the big chemical companies have given up on this registration. I have reason to believe that it may still be in the works with a small company.

I will keep you posted. Meanwhile, we do not recommend the use of baking soda or any other product as a pesticide unless it is registered and the label clearly states its use. *(Nancy Pataky)*

Home, Yard and Garden Pest Newsletter *is prepared by Extension specialists from the University of Illinois at Urbana-Champaign and the Illinois Natural History Survey. Information for this newsletter is gathered with the help of staff members, Extension field staff, and others in cooperation with the USDA Animal and Health Inspection Service.*

Major authors are Phil Nixon and John Lloyd, (217) 333-6650, and Fredric Miller, (708) 352-0109, entomologists; Nancy Pataky, plant pathologist, (217) 333-0519; and Rhonda Ferree, Tom Voigt, and David Williams, horticulturists, (217) 333-0350. Phil Nixon is the executive editor of the Home, Yard and Garden Pest Newsletter. *This newsletter is written by faculty in the Department of Natural Resources and Environmental Sciences and the Department of Crop Sciences. The newsletter is edited by Peggy Currid, typeset by Oneda VanDyke, and proofread by Herbert Morgan, all of Information Services.*

COOPERATIVE EXTENSION SERVICE

HOME, YARD & GARDEN PEST NEWSLETTER

college of agricultural, consumer and environmental sciences, university of illinois at urbana-champaign ▲ illinois natural history survey, champaign

No. 3 • May 7, 1997

This newsletter is issued weekly (biweekly in the early spring and late summer) to provide timely information on insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

HORTICULTURE

Wildflowers: Friend or Foe?

Many wildflowers are blooming in yards across the state. These include Star-of-Bethlehem, spring beauty, violet, and trout-lily. Some people want these plants in their yard, particularly in naturalized areas. However, others find them quite undesirable, particularly in well-maintained lawns.

Star-of-Bethlehem results in a number of calls to Extension. Like other small, spring bulbs, it sends up dark green foliage at the first hint of spring. In a lawn, most homeowners mistake it for wild onion or garlic. However, Star-of-Bethlehem does not have a strong, onionlike smell. Its leaves are flat and have a solid core. If not mowed, Star-of-Bethlehem will produce a flower stalk in mid-May that will have a set of small, star-shaped white flowers.

To keep or increase any of these plants, allow them to flower and set seed; most will self-sow. Delay mowing for as long as possible to build up food reserves in the perennial root structures. Avoid applying postemergence herbicides directly to the plants you wish to keep. Finally, be aware that all of the plants mentioned, except violet, die back to the ground as the weather warms up and within a few weeks will no longer be noticeable.

For those who want to get rid of these wildflowers, we also have a few suggestions. Combination products containing 2,4-D, triclopyr, or clopyralid are preferred. A repeat application may be necessary to eliminate this "weed." *(Rhonda Ferree, adapted from The Ohio State University Extension's* The P.E.S.T. Newsletter, *21 April 1997, Vol. 6, No. 3)*

Cool Temperatures Stall Turf Growth

Cool temperatures have stalled turf growth and development during spring 1997. Recently, one central Illinois turf manager indicated that the soil temperature at his golf course was 48°F on April 24 and, except for perennial ryegrass, very little turf growth was taking place. During a recent trip to the southern part of the state, I saw zoysiagrass and bermudagrass with partial green-up, but putting on virtually no growth. After a warm spell in early spring, turf growth has indeed been interrupted.

Stalled growth this spring makes sense, given the temperatures and turfgrass physiology. Spotty, uneven growth was a common response to the cold and was seen in many parts of Illinois this spring. There are certainly species-response differences to the cold. It has been reported that bunchtype grasses may initiate shoot growth before the spreading species do. Among spreading types, spring green-up of creeping bentgrass is typically slow, while Kentucky bluegrass is usually much better. What's more, differences within a given species can occur. Based on data collected in 1996 and 1997 in Urbana, 'Shamrock' and 'SR2000' were among the Kentucky bluegrasses that showed early spring green-up and growth, while others (for example 'Baron' and 'Unique') showed slower green-up.

Chilling injury that caused a loss of chlorophyll was also seen in parts of Illinois. It was most commonly manifested as yellow patches of mowed tall fescues.

ACES College of Agricultural, Consumer and Environmental Sciences, University of Illinois at Urbana-Champaign

Helping You Put Knowledge to Work—State • County • Local Groups
U.S. Department of Agriculture Cooperating
The Cooperative Extension Service provides equal opportunities in programs and employment.

Table 1. Temperature ranges and growth responses

Growth response	Temperature range
optimal cool-season turf root growth	50–65°F (soil temperature)
optimal cool-season turf shoot growth	60–75°F (at soil surface)
optimal warm-season turf root growth	70–90°F (soil temperature)
optimal warm-season turf shoot growth	80–95°F (at soil surface)
optimal rhizome development	temperatures similar to those for root development
optimal stolon development	appears to occur at temperatures similar to those for optimal shoot growth

Table 2. Optimal temperatures for seed germination for cool-season turfgrasses

	Temperature range	
Turfgrass species	Approximately 16 hours per day	Approximately 8 hours per day
sheep and red fescues	59°F	77°F
creeping bentgrass and Kentucky bluegrass	59°F	86°F
chewings fescue	68°F	77°F
perennial ryegrass and tall fescue	68°F	86°F

Source: Beard, 1977, *Turfgrass Science and Culture.*

Table 1 presents growth responses and the temperature ranges in which they most optimally occur. Be aware that these are not absolutes. For example, Kentucky bluegrass root growth is optimum at 60°F. Management practices such as mowing and fertilization can have some effect as well.

Dormant or spring-seeded turfgrasses may be slow to germinate this season due to the cold soil temperatures. While germination can occur at temperatures below the optimum required, germination is usually slow and sporadic. Optimal germination occurs when soil temperatures alternate during a daily period; these optimal temperatures for cool-season turfgrasses are shown in Table 2.

Cool temperatures may alter other turf management practices as well. For instance, such practices as core cultivation may be delayed until the turf is actively growing. Also, keep in mind that cool temperatures may postpone the need for pest control applications this spring and summer. *(Tom Voigt)*

INSECTS

Internet Resources for Northern Illinois

Extension educators in horticulture and Integrated Pest Management in the Chicago area have placed pest management and horticulture fact sheets and newsletters on the World Wide Web for homeowners and professionals in northern Illinois. These fact sheets and newsletters can be accessed via the University of Illinois Cooperative Extension Service home page (www.ag.uiuc.edu) through the Urban Programs Resource Network.

Also available on the Web is *Horticulture Inside Lines*, a newsletter for the commercial horticulture industry in the Chicago area (www.aces.uiuc.edu/~uplink/Resources/hil.html), lawn care fact sheets for northern Illinois (www.aces.uiuc.edu/~uplink/Resources/lawntalk.html), and *The Bug Review*, a guide to common household and garden pests in northeastern Illinois (www.aces.uiuc.edu/~uplink/bugreview/bugreview.html). *(John Lloyd)*

Spruce Spider Mites

Overwintered eggs of spruce spider mites have now hatched in central and southern Illinois, and populations of this cool-season mite are beginning to build. Thorough coverage of green foliage is necessary to achieve maximum efficacy with any of the miticides recommended in the *1997 Illinois Commercial Landscape and Turf Pest Management Handbook*. As a cool-season pest, spruce spider mites may be a problem again this fall. Since it is unlikely that any spring application will provide 100 percent control,

the progeny of the "leftovers" can contribute to high populations during the cool fall months.

Remember that spider mites also serve as food for many predaceous mites. Using miticides may in some cases aggravate problems by killing the predators that are feeding on the spider mites. This may release the spider mites from the natural control that keeps their populations in check. A simple test can be used to determine whether you have spider mites or predaceous mites. Shake the branch in question over a white paper tablet or other firm white surface. If you notice little yellowish "dots" running all over the place, you probably have predatory mites. Spider mites tend to be less active. For those who really want to "get into" the examination, squish the dots on the paper. If they make a green streak they are plant-feeding mites—most likely spider mites. A yellow-orange streak means that you should feel extremely guilty for sacrificing one of the predators.

Another word of caution: tiny "rust" mites of spruce may also be active. These truly cool-season mites are active in November and December and again from March until mid-May. They can cause considerable yellowing and bronzing of the foliage and premature needle drop. Rust mites, combined with spruce spider mites, are one of the leading causes of needle drop in dwarf Alberta spruces, so look closely! Spruce may be infested with the cigar-shaped rust mites as well as the more rounded spruce spider mites. Rust mites can be controlled with any registered miticide. Again, coverage must be thorough. *(David Shetlar, The Ohio State University, and John Lloyd)*

Spring Grub Control

Annual white grubs will be coming up to feed throughout Illinois as the soil in the root zone rises to 50°F. These grubs feed for only a short time in the spring before pupating and do not need to be controlled unless you have new sod or newly seeded turf in areas that were damaged last fall by grubs. In cases where the turf is becoming established, the loss of even a few roots can be a problem. Several insecticides are suggested for control, including imidicloprid (Merit, Grubex), trichlorfon (Dylox, Proxol), bendiocarb (Turcam, Intercept), and diazinon.

Ever since imidicloprid came on the market as Merit and Grubex, there have been questions about early season applications. This insecticide will last three to four months, so it is feasible to apply it in April or May for grub control in late July and August. Certainly on golf courses where black turfgrass ataenius is a problem, treating with Merit in May when Vanhoutte spirea is in bloom makes sense to control this insect. This Merit application will likely last into late summer and control hatching grubs, although superintendents are advised to look for grubs in early August and treat if numbers warrant it.

Applying Grubex or Merit before July is not recommended. By waiting until July, you can determine the likelihood of a treatable infestation, due to a small adult grub flight or sufficient rainfall to keep unirrigated soil moist and turf green. Such conditions will usually result in a small, undamaging grub population. Also, there is some evidence to suggest that older residues of imidicloprid result in a higher percentage of control failures.

Thus, we recommend that insecticide application for annual white grubs should normally be done either in early July or early August, depending on the conditions and the insecticide used. *(Phil Nixon)*

PLANT DISEASES

Plant Disease Fact Sheets

Many of the disease articles in this newsletter end with an RPD number that refers to an additional source of information—for example, "Refer to RPD No. 621 for more information on anthracnose of shade trees." RPD stands for *Report on Plant Diseases.* These informational summaries on plant diseases in Illinois are prepared by the Department of Crop Sciences and contain a wealth of information about the disease-causing organism(s), conditions needed for infection, and prevention and control strategies. A list of RPDs involving diseases of ornamental plants is printed in the *1997 Illinois Commercial Landscape and Turf Pest Management Handbook,* and a list will also be printed in the pest control circular for homeowners.

RPDs may be obtained from your local Cooperative Extension Service office or from the Department of Crop Sciences. Each report costs $1. Make your check payable to the University of Illinois, and send the order to Department of Crop Sciences, Plant Pathology Extension, N-533 Turner Hall, 1102 South Goodwin Avenue, Urbana, IL 61801. *(Nancy Pataky)*

Bicarbonate Update

After more digging by Bruce Paulsrud and some help from researchers at Cornell University, we have more information about the use of sodium bicarbonate (baking soda) as a preventive fungicide. (See Issue No. 2, April 30, 1997, of this newsletter for the first part of this story.)

Both sodium bicarbonate and potassium bicarbonate have been registered with the Environmental Protection Agency for use as fungicides. This means the active ingredients are registered. An environmentally friendly formulation containing potassium bicarbonate as the active ingredient along with surfactants has been submitted to the EPA and awaits label approval. This formulation is called "Armicarb Potassium Bicarbonate," and its use will include prevention of some foliar fungal pathogens of ornamental plants. It is anticipated that Armicarb Potassium Bicarbonate may be available in some states this summer. (The registration of Armicarb Sodium Bicarbonate is still in a holding pattern.) We couldn't find any specific host information but expect both of these products to provide some control of black spot and powdery mildew on roses at the very least (based on research abstracts found in the literature).

There was also some mention in the EPA search that a product known as Kaligreen has been submitted for registration. It contains potassium bicarbonate and targets powdery mildew on grapes, cucumbers, strawberries, tobacco, and roses. Again, the product has not yet been approved; it is waiting for label approval. We will try to report progress as it occurs. *(Nancy Pataky)*

Rhizosphaera Needle Cast of Spruce

This fungal disease is a particular problem on Colorado blue spruce, but it may also infect other spruce species, as well as some pines. If you have had a problem with this disease in the past, now is the time to take action to help your tree.

How do you know you have had problems? The disease will cause first-year needles to turn brown to purple in the fall. Keep in mind, however, that many environmental stress factors will cause these same symptoms. On trees with Rhizosphaera needle cast, the affected needles may stay attached until the next summer or fall. This needle cast disease eventually causes needles to fall (thus the name) and may kill twigs if infection recurs from year to year. Often the newest needles appear as green, healthy tufts at the end of defoliated branches. Infected trees appear to have "holes" scattered throughout the canopy. When infected needles are moist, the fungal pathogen will form pinhead-sized fruiting structures (pycnidia) in neat rows on the needles. Place affected needles in a plastic bag with a wet paper towel and pycnidia should develop within one to two days. These pycnidia actually protrude from the needle surface, so they are readily visible—especially with a hand lens. The presence of symptoms and fruiting bodies as described is all that is necessary to confirm this disease.

As with most fungal diseases, infection occurs in warm, wet weather. With Rhizosphaera needle cast, spores are released from spring until fall. Good air circulation will help prevent infection, so prune surrounding plants to attain better air movement, or consider removing crowded plants. Fungicides are effective as a preventive control but must be applied when needles are half elongated and again when fully expanded. Chemical options are given on page 89 of the *1997 Illinois Commercial Landscape and Turf Pest Management Handbook. (Nancy Pataky)*

New Publication on Resistant Plants

A publication was recently brought to my attention that may be of interest to many of you: *Pest Resistant Ornamental Plants*, compiled by Deborah C. Smith-Fiola at Rutgers University. It is based on trials around the country and lists resistance to insects and diseases. The publication sells for $7.00 plus $1.70 shipping. Order from Ocean County Board of Agriculture, Rutgers Cooperative Extension, 1623 Whitesville Road, Toms River, NJ 08755-9720. *(Nancy Pataky)*

Home, Yard and Garden Pest Newsletter *is prepared by Extension specialists from the University of Illinois at Urbana-Champaign and the Illinois Natural History Survey. Information for this newsletter is gathered with the help of staff members, Extension field staff, and others in cooperation with the USDA Animal and Health Inspection Service.*

Major authors are Phil Nixon, (217) 333-6650, John Lloyd, (217) 333-6653, and Fredric Miller, (708) 352-0109, entomologists; Nancy Pataky, plant pathologist, (217) 333-0519; and Rhonda Ferree, Tom Voigt, and David Williams, horticulturists, (217) 333-0350. Phil Nixon is the executive editor of the Home, Yard and Garden Pest Newsletter.

COOPERATIVE EXTENSION SERVICE

HOME, YARD & GARDEN PEST NEWSLETTER

college of agricultural, consumer and environmental sciences, university of illinois at urbana-champaign ▲ illinois natural history survey, champaign

No. 4 • May 14, 1997

This newsletter is issued weekly (biweekly in the early spring and late summer) to provide timely information on insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

Pest Management Handbooks

The *Illinois Urban Pest Management Handbook* has been divided into separate publications to better meet the needs of its users. Suggestions for the management of weeds, diseases, and insect pests of professionally managed turfgrass and ornamental plants will be found in the *1997 Illinois Commercial Landscape and Turf Pest Management Handbook* ($8). This book will continue to be revised annually.

The *Illinois Homeowners' Pest Management Guide* will contain suggestions to homeowners for the management of insect pests, diseases, and weeds of turf, ornamentals, vegetables, and fruit. Information on indoor insect pest management will also be included. The book will be available later this spring and will be revised every few years as necessary.

Aquatic weed management suggestions are now available as a separate circular for $2. Greenhouse and interiorscape insects and disease management suggestions will be available as a separate circular later this spring. A rights-of-way weed management circular will be available next year. Until then, refer to rights-of-way weed management suggestions in the *1996 Illinois Urban Pest Management Handbook*, which will be sold as a circular for the rest of this year. The three new circulars will be revised biannually.

The *1997 Illinois Agricultural Pest Management Handbook* ($17) contains suggestions for the management of weeds, diseases, and insect pests for professionally managed vegetable and field crops. This publication is revised annually.

All of these publications can be obtained through your local Extension office or by calling (217) 333-2007 during business hours. *(Phil Nixon)*

INSECTS

Honeylocust Plant Bug

Honeylocust plant bugs are active in central and southern Illinois. At this time of year, they appear as pinhead-sized green insects running actively over the leaves and along the small branches when disturbed.

They overwinter as eggs laid in first-year twigs on honey locust, hatching shortly after the leaves start to emerge. They feed for several weeks in the spring on the expanding leaves, causing the leaflets to be curled and misshapen and to have brown areas. On very heavily attacked trees, the leaflets will fall off and be replaced with new leaves by late June. Less heavily attacked trees will retain their misshapen leaflets through the summer.

The insects mature throughout May, getting larger with each nymphal molt. By late May or early June, the insects turn into adults that are about one-eighth inch long. They have wings and fly readily when disturbed. In June, the plant bugs mate and lay eggs in the still soft and green stems at the branch tips. They remain as eggs through the rest of summer and fall and emerge as nymphs the following spring.

Preventing damage involves scouting and treating at this time of year. Even one bug per compound leaf can cause obvious aesthetic damage. Because field scouting is not likely to detect all of the bugs present, finding three or four bugs per compound leaf cluster probably justifies an insecticide application. Another way to scout is to brush the foliage lightly. If you see

several bugs running on the foliage and along the twig, then treatment is probably warranted.

Control the bugs with sprays of bifenthrin (Talstar), cyfluthrin (Tempo), acephate (Orthene), or insecticidal soap. There appears to be a relationship between spraying for plant bugs and heavy infestations of honeylocust mite later in the summer: these insecticide sprays also kill mite predators, allowing honeylocust mites to build up to high numbers. Thus, if you have trees that tend to have honeylocust mite problems, you might wish to avoid spraying, or use insecticidal soap instead. Insecticidal soap should have less of an impact on mite predators than do the other insecticides.

In Illinois, honeylocust mites tend to occur on trees in hot, dry areas—such as close to buildings and in small parking lot islands. Damaged leaves turn yellowish in mid-to-late summer and drop early, sometimes in late summer. *(Phil Nixon)*

Pollen Bees

Wild honeybees are greatly reduced in number, primarily due to the tracheal mite and Varroa mite, which make honeybee colonies more likely to die out in severe winters. Beekeepers are able to keep their hives healthy with the use of pesticides against the mites, but there are concerns about possible resistance in the mites to these pesticides. These concerns have increased the interest in pollen bees.

"Pollen bees" is a recently coined term referring to bees that do not produce honey or wax in sufficient quantities that people can harvest. Recent research has shown that at least some pollen bees are much more effective pollinators than honeybees are, requiring only hundreds of bees to pollinate the fruit and vegetables that would take tens of thousands of honeybees to accomplish.

Many carry the pollen on hairs on their undersides, making them very efficient pollinators as they visit and brush against flowers. Many pollen bees are present only for a few weeks per year, making it possible to have important crops pollinated without having to worry about additional pollen sources to keep the bees fed during the remainder of the growing season. Following are some of the more common pollen bees.

Mason bees, *Osmia* spp., nest in cavities in wood, soil, and masonry and in the hollow stems of reeds and other plants. They place a mixture of pollen and nectar with an egg inside a cavity that is then lined and capped by a cementlike mixture of clay, sand, and the bee's own oral secretion. The blue orchard bee (*Osmia lignaria*) and the hornfaced bee (*Osmia cornifrons*) are kept and raised in four-by-four-inch blocks of wood with 5/16-inch-diameter holes or bundles of coated cardboard tubes of the same diameter. The blue orchard bee is present as an adult from early April through mid-May in southern and central Illinois and is a dark blue metallic-colored bee just under one-half inch long.

Leafcutter bees, *Megachile* spp., are closely related to mason bees and use similar-sized or smaller holes in similar locations for their nests. They differ in that they cap their nests with circular and oval leaf pieces cut from rose, redbud, maple, and other plants. They are not hairy, are one-quarter to one-half inch long, and are black, metallic blue, green, or purple. The alfalfa leafcutter bee, *Megachile rotundata*, is used commercially, particularly in alfalfa seed fields in western states.

Digger bees, Andrenidae, are small, sparsely haired bees that are commonly gray and black striped. Many common species are about one-quarter inch long, but some species approach one-half inch in length. They nest underground and can be numerous in garden soil, mulched areas, and clay banks. They are present throughout most of the spring and summer.

Sweat and mining bees, Halictidae, are similar to andrenid bees in habits and appearance. They will sting if swatted. They nest underground. Many species are metallic green or black, while others are gray. They are not as hairy as andrenid bees. The alkali bee, *Nomia melanderi*, is used commercially as a pollinator of alfalfa seed crops. Sweat bees are attracted to perspiration, commonly landing and walking around on human skin. In Illinois, the "sweat bees" that most people refer to are actually flower flies. These quarter-inch long, black-and-yellow-banded insects hover around perspiring skin and land to feed on perspiration. They do not bite or sting. Yellowjackets (which are often mistaken for bees) are about one-half inch long, black-and-yellow-banded wasps that are attracted to perspiration and sting readily when disturbed.

Plasterer and yellow-faced bees, Colletidae, are small, dark-colored bees, about one-quarter inch long. Some species are very hairy, others are not. Plasterer bees line their underground burrows with a thin, translucent material. Yellow-faced bees have yellow faces and nest in underground burrows, plant stems, and other crevices and cavities. They are very common in late summer.

Small carpenter bees, Ceratinidae, are about 3/8-inch long, black to metallic blue-green, heavy bodied like bumblebees, and almost hairless when viewed from above. They tunnel out the pith of reeds and brambles for their nests and are quite common later in the summer.

Large carpenter bees, Xylocopidae, are about one inch long. They are yellow and black, with heavy bodies like bumblebees. Unlike bumblebees, their abdomens are totally black with little hair. They nest in one-half-inch-diameter tunnels in wood; they prefer dead branches, logs, and unfinished lumber. Large carpenter bees are active in the spring, and their young emerge during the summer.

Bumblebees, Bombidae, are about one inch long, yellow and black, heavy bodied, and very hairy. They make softball-sized nests underground in old rodent burrows and other cavities. They are active from spring through summer. These bees can be raised commercially and are used in the pollination of greenhouse-grown tomatoes.

Many pollen bees, most of them native, were here pollinating plants before some of the first European settlers brought the honeybee to this continent. With the advent of the two mites parasitic to honeybees, these mite-resistant bees are once again becoming more important in pollination. *(Phil Nixon)*

PLANT DISEASES

Anthracnose of Shade Trees

The anthracnose group of diseases has been addressed repeatedly in the past. Briefly, there are several fungal pathogens that cause spotting or blighting of the leaves and sometimes cankers on stems of plants. These symptoms, along with the development of a fungal spore-bearing structure (known as an acervulus), usually categorize the disease as an anthracnose. The term "anthracnose," then, is a rather general term referring to spotting and blighting of leaves or stems. Accurate identification and control recommendations depend on recognizing the disease symptoms and knowing the host species involved. In Illinois, the major shade trees that often host anthrac- nose are sycamore, ash, oak, maple, elm, and walnut. Wet conditions are a must for all anthracnose diseases.

These fungi cause symptoms to develop on succulent tissue in the spring. Some fungi infect and grow better in cool, wet weather. Others, such as the ash anthracnose fungus, actually grow more quickly in warmer weather. Anthracnose is most prevalent in the spring, probably because of the slow development of the host in the cool, wet conditions prevalent that time of year. Slow host development means a longer time with the presence of tender, succulent, and susceptible plant tissue.

We have not yet seen anthracnose on trees in central Illinois. The weather, however, keeps jumping from cool days to warm days to very cool nights, so leaf development has been slow. Also, some areas have received abundant rain. In those areas, I suspect anthracnose will show in about one or two weeks. Dry areas may be able to avoid problems with anthracnose in 1997.

Unless a tree has been repeatedly hit by anthracnose fungi in the past, we do not recommend the use of fungicides. Anthracnose diseases do not kill trees; some defoliation may occur, but refoliation with healthy leaves follows in warmer weather. Concentrate on helping tree vitality, which will promote new growth. Remove dead or dying branches, water in periods of drought, and fertilize the tree when appropriate. If fungicides are chosen as a disease control for anthracnose, keep in mind that fungicides are effective only as preventives and should have been initiated when buds first began to open. Options are listed in the *1997 Illinois Commercial Landscape and Turf Pest Management Handbook* under the specific host in question. For more information on anthracnose of shade trees, refer to *Report on Plant Diseases* No. 621. *(Nancy Pataky)*

Fire Blight This Year?

Fire blight is a potentially serious disease that appears in years when warm, wet conditions occur during blossoming. Fire blight is a disease of about 75 different plant species in the Rosaceae family. Those affected in Illinois generally include apple, pear, susceptible crabapples, mountainash, and quince. The causal agent is a bacterium, *Erwinia amylovora*, which thrives in temperatures of 65°F or higher in wet conditions (even a dew will suffice).

Fire blight may appear as a blossom blight, shoot blight, or branch and trunk canker. Infected blossoms wilt and turn brown to black. Initial infection occurs in the blossoms, and then the bacteria may move down the pedicel, into the fruit spur, initiating shoot blight. Often the result is a bending of the tip of the shoot, giving it a shepherd's crook appearance. This is the phase recognized by most growers. Some species, such as mountainash, may not show the crooking but

will have a blackened or brown blight of the shoot terminals as though the branch had been burned by a fire (thus the name "fire blight"). Dark-brown to black cankers of the wood often follow.

This disease has been severe in the past few years, and we have received several questions this year at the clinic from people concerned about this year's plants.

Dr. Steve Ries is a fruit pathologist on campus. He supervises the U of I fruit pathology farm at which a computer-based program is used to predict occurrences of fire blight. The computer program uses temperature and moisture data from a weather station in the orchard and estimates surface bacterial growth to predict low, medium, and high threats of fire blight. Fruit growers initiate chemical sprays based on these predictions.

According to Ries, data gathered by the computer program this year do not suggest that fire blight will be a threat in central Illinois in 1997. Of course, he is quick to point out that conditions can change in as few as two or three days.

The initial bacterial infection occurs in blossoms during warm, wet weather. Central Illinois apples are already at full bloom, and temperatures are cool and predicted to remain so. Therefore, the threat of fire blight is currently low to nonexistent. If blossom infection does not occur, then shoot blight in June will also be reduced. Computer data analyses have not predicted any need for sprays in the northern two-thirds of the state. Southern Illinois growers, however, may be seeing fire blight now. (Fire blight has been reported in the St. Louis area.)

What does this mean for ornamental hosts of fire blight? Basically, the information discussed still applies. Many ornamental rosaceous hosts flower later than edible apples, so blossom infection could still occur on susceptible hosts, but we do not advocate spraying for fire blight on ornamentals. If infection occurs, try pruning out the first blighted tips, but disinfect pruners with household bleach or rubbing alcohol between cuts to avoid spreading the bacterial pathogen. If the disease still spreads, prune during hot, dry weather. Forcing abundant succulent growth by heavy spring pruning will provide more susceptible tissue and more opportunities for infection. Avoid high nitrogen levels for the same reason. To allow better air flow, try to maintain an open habit for plants. Also, there are many resistant varieties now available in the ornamental trade. For more information on fire blight, consult *Report on Plant Diseases* No. 801. *(Nancy Pataky)*

HORTICULTURE

Ground Ivy Control

Recently, I have heard discussion about using borax as a control for creeping Charlie (ground ivy). According to the U.S. Environmental Protection Agency, it is legal for a homeowner to apply borax as a weed control on his or her own home lawn. However, it is not legal to sell or commercially apply borax as a control for ground ivy because it is not labeled for that use. Furthermore, the University of Illinois Cooperative Extension Service does not recommend borax for creeping Charlie control because no substantive research has been conducted on application rates, timing, and techniques. Although borax may cause some damage to creeping Charlie, it may also damage the turf or other plants in the area.

Creeping Charlie is one of the most troublesome broadleaf weeds in turf. It commonly starts in poorly drained, shaded areas and often creeps into sunnier areas. Unfortunately, once ground ivy gains a foothold, it is difficult to control using cultural practices. Hand-pulling is a laborious process and, even when repeated, rarely reduces the weed population. Improving light penetration and soil drainage may help the turf compete with this weed but is not a long-term solution.

The *1997 Illinois Commercial Landscape and Turf Pest Management Handbook* lists several possible controls for creeping Charlie. Combination products (e.g., 2,4-D + MCPP + dicamba, or 2,4-D + triclopyr) will usually provide better control than products containing a single herbicide. Be aware that controlling creeping Charlie may require more than one herbicide application. Finally, always read, understand, and follow the label directions when using any pest control product. This will result in the safest use, as well as the most effective results. *(Tom Voigt)*

Home, Yard and Garden Pest Newsletter *is prepared by Extension specialists from the University of Illinois at Urbana-Champaign and the Illinois Natural History Survey. Information for this newsletter is gathered with the help of staff members, Extension field staff, and others in cooperation with the USDA Animal and Health Inspection Service.*

Major authors are Phil Nixon, (217) 333-6650, John Lloyd, (217) 333-6653, and Fredric Miller, (708) 352-0109, entomologists; Nancy Pataky, plant pathologist, (217) 333-0519; and Rhonda Ferree, Tom Voigt, and David Williams, horticulturists, (217) 333-0350. Phil Nixon is the executive editor of the Home, Yard and Garden Pest Newsletter.

COOPERATIVE EXTENSION SERVICE

HOME, YARD & GARDEN PEST NEWSLETTER

college of agricultural, consumer and environmental sciences, university of illinois at urbana-champaign ▲ illinois natural history survey, champaign

No. 5 • May 21, 1997

This newsletter is issued weekly (biweekly in the early spring and late summer) to provide timely information on insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

PLANT DISEASES

Bacterial Soft Rot of Iris

Bacterial soft rot causes the lower leaf tissue and the rhizomes of iris to rot, destroying hope for flower production and eventually killing the plant. Because the pathogen is a bacterium and because the tissue is very succulent, a soft, mushy, smelly rot results. Early stages of infection may show leaf tip browning and leaf wilt, but that often goes unnoticed or is blamed on water imbalances. Water-soaked streaks may extend down the leaves. The bacterium causes the entire rhizome interior to rot, leaving only the tough outer skin intact. This is a particularly tragic disease because iris plants take so long to form established beds. However, because the pathogen can enter only through wounds, it can be avoided.

The major cause of wounding is the iris borer; the bacterium enters the young leaves in wounds made by the borer. If you have had problems with borers in the past, consider using insecticides. Entomologists recommend the use of dimethoate (Cygon 2E) in April or when leaves are five to six inches tall. Only one treatment is recommended. Follow the label directions carefully. The chemical is to be used as a dilute spray, not a concentrate.

If you discover that your irises have soft rot and borers, you could remove rotted plants now. When it is time to divide plants, remove all rotted plants, or the rotted portions, and allow rhizomes to dry in the sun. Replant in a new location, if possible, choosing a site with good drainage. When replanting, allow the upper half of the rhizome to remain out of the soil to help avoid future problems. *(Nancy Pataky)*

Gray Mold of Strawberry

Gray mold is caused by the fungus *Botrytis cinerea* and thrives in cloudy, rainy weather on dense, lush foliage, especially in areas with poor air movement. Strawberry fruit infection can greatly reduce yields and may cause storage problems after harvest. The gray, moldy growth produced by this fungus is familiar to most gardeners. The mold appears on flowers, vegetables, and fruit—indeed, on almost any plant material. The growth is a mass of spores and mycelia of the fungus. Wind can easily move these spores from plant to plant.

Early detection is necessary. Fruit pathologist Dr. Steve Ries says the disease begins as a blossom blight. He emphasizes that control of the early phase of the disease will greatly reduce, if not eliminate, later fruit infection. Many strawberries in the central part of the state are in bloom now, so watch for symptoms of blossom infection. One or several blossoms may turn brown and die. Once blossom infection sets in, the dead material will be covered with a gray, moldy growth.

Read about cultural controls for this disease in *Report on Plant Diseases* No. 704. Obviously, a sunny planting site with sufficient air movement and good soil drainage is preferred. Proper plant spacing will improve air flow, and proper fertilization will help prevent an overabundance of lush, susceptible foliage. Because rotted or injured plant material is more likely to become infected with this fungus, use

ACES College of Agricultural, Consumer and Environmental Sciences, University of Illinois at Urbana-Champaign

Helping You Put Knowledge to Work—State • County • Local Groups
U.S. Department of Agriculture Cooperating
The Cooperative Extension Service provides equal opportunities in programs and employment.

straw mulch to cut down on fruit rot and to keep fruit off the ground.

Fungicides are very effective in controlling gray mold on strawberry. However, as Ries pointed out, the goal is to control blossom infection so that the fruit will not have to be sprayed later. Sprays are ideally initiated when the plants are at 10 percent bloom, and sprays must be continued every seven to ten days throughout the bloom period. Many fungicides are labeled for this use, but be certain to check the label for proper registration, rates, and timing before spraying. Captan, Thiram, and Benlate will work and are fairly easy to obtain for commercial operators and homeowners alike. *(Nancy Pataky)*

Leaf Curl and Blister

The clinic has received several calls concerning leaf curl and leaf blister. Reports from Ohio indicate the diseases have been seen there, as well.

Peach leaf curl occurs on peach, nectarine, and some ornamental *Prunus* species. "Leaf curl" and "leaf blister" refer to a similar group of diseases on oak and occasionally on poplar. Several *Taphrina* species (fungi) cause all of these diseases. Leaf distortion and blisterlike growths or puckering of the leaves is common. The leaves are often thickened and almost crisp. Leaves turn downward and inward and may become red or purple.

The causal fungi overwinter in buds and twigs. They infect leaves and flowers in the cool, moist weather of early spring, from bud swell to bud opening. Ideal temperatures for infection are 50°F to 70°F. Infected trees may show early leaf drop, but generally the life of the tree is not threatened. Repeated yearly infections may weaken a tree and predispose it to other problems.

The reduced quality of fruit is a concern. For fruit growers, we recommend a single dormant fungicide spray before budbreak; most commercial growers incorporate this treatment into their spray programs. Landscape managers should focus on promoting tree health by pruning, watering, and fertilizing, rather than relying on fungicides. (At this point in the season, fungicides would be useless against this disease anyway.) For more information on leaf curl and blisters, consult *Report on Plant Diseases* No. 805, Peach Leaf Curl and Plum Pockets, or No. 663, Oak Leaf Blister. *(Nancy Pataky)*

Juniper Tip Blight

Another fungal disease initiated in warm, wet weather is Phomopsis tip blight. We see this blight on arborvitae, Douglasfir, and true firs, but the typical host in Illinois is juniper. The usual symptom is twig tip blight. Infection appears first on the youngest needles (older needles are resistant), starting as yellowish spots. The tips of shoots soon fade to light green and eventually turn reddish brown. A grayish band is often visible at the base of the dead shoot. In this band are pinhead-sized black fruiting bodies (pycnidia). The fungus survives over the winter in the pycnidia on the previous year's infection.

Infection is not initiated until temperatures are warm (60°F to 80°F) and moisture is present. New, succulent tissue is susceptible to infection by this fungus, but there is a great deal of difference between juniper cultivars in terms of resistance to this tip blight. Once infection occurs, it will be another seven to ten days before any symptoms might begin to show. Pycnidia develop on current-year growth three to four weeks after infection. This means you will soon be seeing current-year symptoms of Phomopsis blight on your susceptible junipers.

Planting resistant varieties is the easiest way to control this disease. Still, Phomopsis may be controlled by pruning out infected foliage when the plant is dry and by using preventive fungicides. Pruning is important because the most common source of spores is the infected tissue from the previous year. Prune dry foliage to avoid spreading spores.

Fungicides can protect new, healthy foliage from Phomopsis blight. Although sprays should have been initiated in early spring, they may still have some benefit if wet weather is expected and plant growth is active. Consult the *1997 Illinois Commercial Landscape and Turf Pest Management Handbook* for chemical options. Homeowners can try mancozeb products or products containing thiophanate-methyl (such as Ferti-Lome Halt) or copper sulfate (such as Hi-Yield Bordeaux mix). Always read the label for crop or host clearance. *Report on Plant Diseases* No. 622 contains more information on Phomopsis tip blight of juniper, including resistance ratings. *(Nancy Pataky)*

HORTICULTURE

Postemergence Chemical Controls of Broadleaf Weeds in Turf

In areas where cool-season annual and perennial broadleaf weeds are actively growing, it is time to initiate postemergence herbicide controls.

Studies conducted over several years at the University of Illinois Landscape Horticulture Research Center show that several herbicides provide effective postemergence control of common broadleaf weeds such as white clover, dandelions, and plantains. These herbicides are 2,4-D + MCPP + dicamba; triclopyr + clopyralid; and 2,4-D + triclopyr. For additional information regarding other chemical weed controls or other weeds, see Chapter One of the *1997 Illinois Commercial Landscape and Turf Pest Management Handbook.*

When using any chemical pest control, be sure to read, understand, and follow the label directions for proper use of these chemicals. If mishandled or misapplied, postemergence broadleaf herbicides may damage or kill many desirable ornamental or edible plants in the landscape. Follow these general recommendations when using postemergence broadleaf products.

1. Apply postemergence broadleaf herbicides when weeds are young and actively growing.
   - Avoid applications when weeds are heat- or drought-stressed; such conditions might interfere with herbicide uptake or translocation.
   - Do not mow for a few days before and after application. This allows maximum leaf surface for interception and absorption of herbicides.
   - Apply these herbicides to newly seeded turfgrass only after the grass has been mowed three or four times. Wait at least 30 days following application before seeding into areas treated with postemergence broadleaf herbicides. Bromoxynil can be applied to newly seeded, nonresidential turf to control some broadleaf weeds.
2. Apply postemergence broadleaf herbicides when environmental conditions are appropriate for control.
   - To avoid drift, be aware of wind speed. Often, wind is less of a problem in early mornings.
   - Do not apply these herbicides when air temperatures are expected to exceed 85°F.
   - Maintain adequate soil moisture; this will encourage translocation of herbicide throughout the entire weed.
   - Do not apply these herbicides when precipitation is expected within 24 hours. Do not irrigate turf for several days following application.
   - Be especially cautious when using ester formulations as air temperatures rise. Ester-formulated broadleaf herbicides are more prone to volatilization than amine-formulated herbicides.
3. Limit the use of pesticides by making spot applications where possible, rather than treating large areas.
4. Because many cool-season annual and perennial broadleaf weeds are best controlled in autumn, apply postemergence herbicides during the fall when broadleaf weeds are actively growing. Use herbicide applications in the spring to control broadleaf weeds that escape autumn control. *(Tom Voigt and Bruce Branham)*

INSECTS

Oystershell Scale

Oystershell scale brown race eggs have hatched into crawlers in southern Illinois. They will hatch soon in central and northern Illinois, as will the gray race crawlers in southern Illinois.

Oystershell scales overwinter on the host as eggs under the scale covers of the females. These scale covers are about one-eighth inch long and shaped like an oyster shell—wider at one end and curving slightly toward the other, narrower end. There are two races of scale. The brown race is almost uniformly brown; the gray (or banded) race has bands of brown and gray. Older scale covers of the gray race tend to become whitish.

The eggs hatch into tiny gray nymphs called "crawlers," which is the dispersal stage of this insect. The crawlers move actively over the foliage and branches. Scale crawlers travel to new hosts by raising their back end into the wind, which makes them easily blown off the plant. They also crawl onto the feet of birds, who carry them to new host plants.

After a crawler period of ten days to two weeks, the scales settle onto the stems of the plant, where they feed, molt to the next nymphal stage, and secrete a waxy covering over the body. This waxy covering protects the insect from insecticides, making it difficult to control after the very vulnerable crawler

stage. Throughout their lives, the scales suck the sap out of the plant and, through successive nymphal and adult molts, lose their eyes, antennae, and legs as they grow larger and increase the size of their waxy covers.

Oystershell scale is known to feed on over 120 hosts. Heavy infestations will cause dieback or death of the host. The insect is frequently present for several years on only one or two branches before spreading. The brown race is most common on apple, dogwood, and poplar.

Crawlers appear when bridal wreath spirea (*Spiraea* x *vanhouttei*) is in full to late bloom, according to Don Orton in the book, *Coincide*. The gray race is most common on lilac, ash, willow, poplar, and maple. Its crawlers appear when *Spiraea* x *vanhouttei* finishes blooming.

Both the brown and gray races are found on most host plant species. The brown race has a second generation of crawlers through much of Illinois, when hills-of-snow hydrangea (*Hydrangea arborescens* 'grandiflora') blooms are turning from white to green and when wild carrot (*Daucus carota*), also known as Queen Anne's lace, is blooming.

When bridal wreath spirea is in early bloom, scout infested plants every two or three days by looking for crawlers on the branches and leaves. If you have a microscope or powerful hand lens, flip over a few scale covers with a knife tip or pin and check for hatched crawlers under the covers. The hatched crawlers will stay under the scale covers for several days before they emerge onto the plant, where they can be controlled with insecticides. With this technique, it was determined that brown race scale on lilac in east central Illinois was still in the egg stage on May 16.

Control of the crawlers can be achieved with many contact insecticides, such as insecticidal soap, summer spray oil, malathion, diazinon, acephate (Orthene), cyfluthrin (Tempo), lambda-cyhalothrin (Scimitar), and permethrin (Astro). Control of older nymphs and adults that are protected by their waxy covers is difficult. *(Phil Nixon)]*

Lilac/Ash Borer

Landscapers and nursery personnel should be on the lookout for the lilac borer (*Podosesia syringae*), also called the ash borer. The lilac borer is a clearwing moth that resembles a wasp. The moths overwinter as late instar larvae and emerge as adults from pupal cases in spring to mate and lay eggs. Eggs are laid and hatch in late May or early June, depending on their location in Illinois. Larvae burrow into affected plant materials and feed on the phloem tissue. Unlike beetle borers (such as bronze birch borer), clearwing moth larvae leave an entrance hole to the outside where sap and sawdust collect.

Like most boring insects, the lilac borer takes advantage of plants that are low in vitality due to environmental stress. Newly transplanted materials are extremely susceptible to this moth. The lilac borer will injure lilac, ash, privet, and other members of the olive family. In addition to cultural methods such as watering and mulching to increase the vitality of the plants, well-timed insecticidal treatments can be used to control lilac borer.

Traps that contain an attractant pheromone are available. The pheromone in the traps is an analogue of the sex pheromone produced by the female moth. Moths caught in the traps are males looking for unmated females. The traps themselves will not cure the problem, because only males are caught and, even so, some will undoubtedly avoid the trap and inseminate females. The pheromone traps are most useful in providing a more accurate estimate of when to treat.

Current recommendations suggest treating the branches and trunk of plant materials with chlorpyrifos (Dursban) one week after peak trap catch. This treatment also coincides with the time when Vanhoutte spirea is in mid- to late bloom. These plants are already in mid-bloom in southern Illinois and early bloom in central Illinois. *(John Lloyd)*

Other Vanhoutte Spirea Phenology Indications

Besides lilac borer and oystershell scale, which are discussed in detail above, several other insect events correlate with the blooming of Vanhoutte spirea. The following information, from the book *Coincide*, should help practitioners plan scouting activities.

Birch leafminer: Look for small mines when blooming starts.

Pine needle scale: Red crawlers are active when blooming starts.

***Taxus* mealybug:** Nymphs are active during blooming.

Lilac/ash borer: Egg hatch begins in full to late bloom.

Oystershell scale (brown race): Crawlers hatch and are active in full to late bloom.

Black vine weevil: Look for feeding notches as blooming finishes.

Bronze birch borer: Egg hatch begins when blooming finishes.

Elm leaf beetle: Feeding damage will begin to occur as blooming finishes.

Oystershell scale (gray race): Crawlers hatch when blooming finishes. *(John Lloyd)*

European Pine Sawfly

Cool weather has certainly slowed insect development in northern Illinois. Scouts at the Morton Arboretum in Lisle noticed European pine sawfly hatching from eggs during the week of May 11 to 16. Feeding by sawfly larvae in central and southern Illinois is continuing two to three weeks ahead of their northern counterparts. Damage is becoming obvious south of Interstate 80, with infested trees exhibiting the tufts of new growth without needles behind them. Remember that sawflies are not caterpillars and will not be killed by any of the *Bt* (*Bacillus*) products used for caterpillar control. Carbaryl (Sevin) is extremely effective against sawflies. Other effective controls are listed in the *1997 Illinois Commercial Landscape and Turf Pest Management Handbook. (John Lloyd)*

Other Pine Problems

As pines continue to turn brown across the Midwest, more and more homeowners, as well as nursery managers and Christmas tree growers, are "discovering" insect problems. Generally, Zimmerman pine moth has been the main problem, but some others are showing up. A little discussion on how to identify these various critters is in order.

First, the Zimmerman pine moth produces fairly large pitch masses that contain bits and pieces of sawdustlike material, which is actually frass (bug feces). At this time, most of these masses should be fairly hard because they are from last year's activity. The new crop of Zimmerman caterpillars is very tiny now and is just beginning to make new pitch masses. However, their previous feeding at the bases of branches may now be causing branches to die (or at least turn brown) and break off in wind storms.

If a pine shoot (generally about the diameter of a pencil) suddenly wilts or turns brown from now until mid-June, suspect the pine shoot moth. This insect is most common in white pine, although Scotch pine is occasionally attacked. The caterpillar, which will be inside the stem, is usually cream-colored with a greenish cast. If you find a pinkish or burgundy caterpillar, it may be an errant Zimmerman.

Any small black or brown beetles in shoots now are most likely pine cone beetles, not pine shoot beetles. Pine cone beetles are nothing to worry about. *(Dave Shetlar, The Ohio State University)*

Periodical Cicadas

Periodical cicadas will emerge this year near the end of May in a few Illinois counties. Next year will bring a large emergence throughout most of the southern two-thirds of the state. Very small trees may be subject to heavy damage by this insect's egg-laying activities.

Periodical cicadas occur in most areas of the eastern half of the United States. In the northern half of the country, these insects have a 17-year life cycle; those in the southern half have a 13-year life cycle. Nymphs that hatch from eggs inserted into stems drop to the ground, burrow into the soil, and find a root to feed upon. The nymphs suck sap from the roots until the last year of their life cycle, when they emerge from the soil in the late spring, climb a tree, and emerge as adults.

The adults are black, about one-and-one-quarter inch long, and have red eyes. They have clear wings with orange veins. The adults do little feeding, spending most of the daylight hours involved in reproductive activities. Male cicadas sing during the day to attract females. Mated females select twigs and branches up to one inch or more in diameter and insert their eggs into slits that they make with their ovipositors.

In 1997, we anticipate emergence of the 17-year brood in Henderson, Warren, Knox, Fulton, Schuyler, northeastern Brown, and southeastern McDonough counties in western Illinois. Periodical cicada emergence will also occur in DeWitt, northern Piatt, and northwestern Champaign counties.

In 1998,we anticipate emergence of the 13-year cicadas from Hancock and eastern McDonough

counties south to Morgan, Sangamon, and Macon counties and also from Ford, southern Livingston, and western Iroquois counties south. The rest of southern Illinois is included in this 13-year brood emergence except Iroquois, Vermilion, Edgar, Clark, Crawford, Lawrence, and Wabash counties on the east and Alexander, Pulaski, Massac, Union, Jackson, Perry, and southern Randolph counties in southern Illinois.

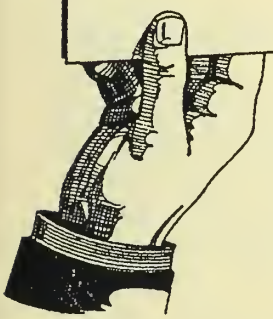
Periodical cicadas are a threat to small trees with trunk diameters of two inches and smaller. Their egg laying may cause trunks and branches to snap off in windy conditions. Avoid planting very small trees before an emergence in areas where cicadas are likely to appear. Realize, though, that even in the regions listed above, some areas will have few cicadas or none at all. If an area has been cleared of trees and shrubs within the last few hundred years or was originally prairie, periodical cicadas are unlikely to be present. These insects do not fly very far from where they emerge. That fact, combined with their long generation times, means that the spread of periodical cicadas is very slow.

Insecticides are only marginally effective against cicada, with carbaryl (Sevin), bifenthrin (Talstar), permethrin (Astro), lambda-cyhalothrin (Scimitar), and cyfluthrin (Tempo) providing only a small amount of control. Young trees with small trunks should be protected with hardware cloth, screening, or tree wrap during the few weeks that the adult periodical cicadas are present. *(Phil Nixon)*

Home, Yard and Garden Pest Newsletter *is prepared by Extension specialists from the University of Illinois at Urbana-Champaign and the Illinois Natural History Survey. Information for this newsletter is gathered with the help of staff members, Extension field staff, and others in cooperation with the USDA Animal and Health Inspection Service.*

Major authors are Phil Nixon, (217) 333-6650, John Lloyd, (217) 333-6653, and Fredric Miller, (708) 352-0109, entomologists; Nancy Pataky, plant pathologist, (217) 333-0519; and Rhonda Ferree, Tom Voigt, and David Williams, horticulturists, (217) 333-0350. Phil Nixon is the executive editor of the Home, Yard and Garden Pest Newsletter. *This newsletter is written by faculty in the Department of Natural Resources and Environmental Sciences and the Department of Crop Sciences. The newsletter is edited and typeset by Peggy Currid and proofread by Herbert Morgan, both of Information Services.*

Reference and Teaching Materials from the University of Illinois



Quality You Expect

Expertise You Want

ACES

College of Agricultural, Consumer and Environmental Sciences
University of Illinois at Urbana-Champaign

The *Illinois Commercial Landscape and Turf Pest Management Handbook* is a must for any horticulture professional or educator. Topics include management of weeds, insect pests, and diseases for

- turfgrass
- landscaping
- nursery crops
- woody ornamentals
- flowers, trees, and shrubs

using both chemical and nonchemical controls.
Revised Annually
ICLT-97 ..... *$8.00*

In pest and weed identification, pictures are worth a thousand words. The combination of high-quality information and superb photography makes these slide sets great teaching tools in classrooms or staff trainings.

Lawn Weeds-Identification and Control

76 frames with script
S650a *$39.85*

Takes the learner through a step-by-step approach to controlling weeds in turf.

Shade Tree and Woody Shrub Insects: Identification and Control
78 frames with script
S654.4 ..... *$40.85*

Turf Insects: Identification and Control
39 frames with script
S654.2 ..... *$41.85*

Two sets that help the learner identify pests, understand their life cycles and then select appropriate chemical and nonchemical controls to manage them.

Photo sheets make great identification tools. Photos on one side with descriptions and explanations on the back. Certainly an effective study aid for any student. High quality at a very reasonable price. Here's a sampling of what you can order:

- *Ornamental Insects* X698.16
- *Tree and Shrub Pests I* X698.17
- *Turf Pests I* X698.31
- *Tree Diseases I* X699.16
- *Tree Diseases II* X699.17
- *Tree Diseases III* X699.18
- *Woody Ornamental Diseases I* X699.30
- *Turfgrass Diseases I* X699.31
- *Turfgrasses for the Midwest* X699.35
- *Turfgrass Establishment in the Midwest* X699.36

$ .40 each

Looking for more resources?

Here are two World Wide Web sites packed with possibilities from the University of Illinois!

www.ag.uiuc.edu/~vista/catalog/catintro.html
www.aces.uiuc.edu/~vo-ag/

To order the *Illinois Commercial Landscape and Turf Pest Management Handbook, slide sets and photo sheets* call (217) 333-3871. MasterCard and Visa accepted. Bulk discounts available. Shipping is extra and may vary by order. Orders over $10.00 may be billed.

COOPERATIVE EXTENSION SERVICE

HOME, YARD & GARDEN PEST NEWSLETTER

college of agricultural, consumer and environmental sciences, university of illinois at urbana-champaign ▲ illinois natural history survey, champaign

No. 6 • May 28, 1997

This newsletter is issued weekly (biweekly in the early spring and late summer) to provide timely information on insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

HORTICULTURE

Managing Aquatic Vegetation

Aquatic vegetation is useful in many ways, but an excess of such plants can cause problems. Because aquatic areas are special ecosystems, control measures must be chosen carefully. For more information, refer to the new circular on aquatic weed management. [To order, call (217) 333-2007.]

The most important step in controlling aquatic vegetation is proper identification. Control measures vary widely, depending on weed type. If you are not familiar with aquatic vegetation (including algae types), call your Extension office for help.

Another important factor to consider is site use. Most aquatic herbicides have use restrictions (listed as the number of days that must pass before the site should be used as intended). Before selecting a herbicide, you should know whether the water will be used for human consumption, animal consumption, swimming, fish, or irrigation.

Control options include chemical and nonchemical measures. Several nonchemical control options are available: Preventive control is achieved through nutrient control or habitat manipulation; mechanical control physically removes the vegetation; cultural control includes the use of drawdowns, dyes, plastics, or aeration; and biological control relies on geese, swans, or triploid grass carp, all of which feed upon aquatic vegetation.

Only a handful of herbicides are labeled for use in aquatic areas. Commercial applications require an aquatic applicator license from the Illinois Department of Agriculture. In general, chemical recommendations are as follows:

Vegetation Type	Recommended Herbicide(s)
Algae	copper products
Flowering plants	
submersed (pondweeds, naiads, watermilfoil)	Aquathol, Sonar, or Reward
free-floating	Rodeo
rooted-floating (lilies)	Rodeo or 2,4-D
emergents (cattails)	2,4-D Amine or Rodeo

Always follow label directions closely.
(Rhonda Ferree)

INSECTS

Turf Insects

True white grub adults are flying in central and southern Illinois. They lay eggs in turf, which can cause turf root damage later in the summer. Adults feed at night on the leaves of many trees, but they prefer ash, crabapple, and oak. Checking damaged trees after 10:30 P.M. will reveal large numbers of these inch-long, reddish brown to dark brown, stocky May beetles feeding on leaf margins. Leaf foliage may be eaten all the way to the midvein. An application of carbaryl (Sevin) should be effective in preventing further injury.

Sod webworm may become an important turf pest if this spring continues to stay drier than normal. These slender, gray-to-tan colored caterpillars with dark brown spots live in silk-lined tunnels in thatch

ACES College of Agricultural, Consumer and Environmental Sciences, University of Illinois at Urbana-Champaign

Helping You Put Knowledge to Work—State • County • Local Groups
U.S. Department of Agriculture Cooperating
The Cooperative Extension Service provides equal opportunities in programs and employment.

during the day, emerging at night to feed on grass blades. Damage is seen as brownish turf areas as a result of thatch showing through thinned-out feeding areas. There may also be green, pinhead-sized fecal pellets present. Damage is more likely to occur first on berms, slopes, and other well-drained areas. Sprays of chlorpyrifos (Dursban), carbaryl (Sevin), diazinon, bifenthrin (Talstar), or trichlorfon (Dylox, Proxol) should be effective controls. (Remember that diazinon cannot be applied at golf courses and sod farms.) The nematode *Steinernema carpocapsae*, sold as Biosafe and Vector, should also be effective.

Black turfgrass ataenius first-generation larvae hatch—and are treatable—when bridal wreath spirea (*Spiraea* x *vanhouttei*) is in full bloom. The 1/4-inch, black beetles have been seen on golf greens for several weeks, but the insects are controlled most effectively during the early larval or grub stage. The second generation is controlled along with annual white grub in late summer. Black turfgrass ataenius is likely to be a pest only in highly managed turf areas such as golf course greens and fairways. Damage is most common along the aprons of greens and in fairway swales where water accumulates from irrigation. Any of the recommended white grub insecticides are effective for control. *(Phil Nixon)*

Caterpillars

Cankerworms, pine sawfly larvae, and eastern tent caterpillars continue to be active throughout the state. This year, eastern tent caterpillar is as uncommon in northern Illinois as it is common in southern Illinois—only one colony has been found at the Morton Arboretum in Lisle. The Morton Arboretum also reports that pine sawfly larvae have just recently hatched and are still quite small, so it will take careful scouting in northern Illinois to detect this pest.

White-marked tussock moth larvae are hatching from eggs in east-central Illinois. The best way to identify these caterpillars when they are young larvae is to examine the egg mass, which is white and fuzzy with little white eggs. As with moth caterpillars, young larvae feed on the lower epidermis of the leaf but not the upper epidermis, which results in a windowed appearance.

Achieve control of all these caterpillars when they are young by pruning out or removing the egg mass and any associated young larvae. *(Phil Nixon, John Lloyd, and Fredric Miller; Karol Jacobs of the Morton Arboretum)*

Sap-Feeding Arthropods

Honeylocust plant bug is present throughout Illinois and feeding on the leaflets of honey locust. Leaflets in central Illinois are already starting to show the distortion and curling associated with feeding damage. Control these insects with synthetic pyrethroid sprays such as bifenthrin (Talstar), cyfluthrin (Tempo), lambda-cyhalothrin (Scimitar), or permethrin (Astro). Imidicloprid (Merit) will also be effective. Insecticidal soap and summer spray oil are effective on small nymphs. If the treated trees tend to have problems with honeylocust mite later in the summer, use one of these latter two materials to reduce the impact on mite predators.

Ash plant bug continues to be present throughout the state. Where populations are large, the insecticides suggested for honeylocust plant bug are effective in preventing heavy damage.

Oystershell scale brown race has hatched in central Illinois. Crawlers should be present and treatable through the end of the month. Crawlers of the gray or banded race should be hatching in about a week in central Illinois and should already be present in southern Illinois. This scale should start hatching in northern Illinois near the end of May.

Potato leafhopper is present in southern and central Illinois. In central Illinois, only the slender, 1/8-inch-long, green adults are present. Look for them on leaf undersides, particularly on red maple, sugar maple, redbud, and winged euonymous (burning bush). Sprays of the insecticides listed above for honeylocust plant bug are effective on this insect. Also, imidicloprid, sold as Merit, is effective if applied as a soil injection or soil drench. The soil drench is most effective on bare soil. This insecticide will move systemically to branch tips and provide control. One soil application should provide season-long control.

Spruce spider mite continues to feed throughout the state. This mite and its close relatives will be feeding on spruce, juniper, pine, and other needled evergreens into late June before laying over-summering eggs. Before initiating treatment, be sure that these mites are correctly identified. Knock some of them off the foliage onto a piece of white paper. Plant-feeding mites will make green streaks when squashed. Dicofol (Kelthane), insecticidal soap, summer spray oil, and several pyrethroids are effective against these pests.

Hemlock eriophyid mite (hemlock rust mite) is active at the Morton Arboretum. Although eriophyid mites are usually associated with gall formation (maple bladder mite) or the stunting of new growth (cyclamen mite), the hemlock rust mite feeds on the needles. Heavily attacked needles turn blue and then brown before falling off. Feeding occurs primarily during the spring, with populations dropping and remaining low throughout the summer. This mite also attacks fir, spruce, yew, and golden-larch (*Pseudolarix*). Dicofol (Kelthane), insecticidal soap, and summer spray oil should provide control. *(Phil Nixon, John Lloyd, and Fredric Miller; Karol Jacobs of the Morton Arboretum)*

"Phantom" Insects

The cold snaps that dropped the temperatures below freezing a couple of weeks ago damaged many immature leaves and buds. This damage became apparent as the leaves unfolded, revealing dead leaf tissue or holes where tissues dropped out. When new leaves are damaged by cold and high wind, they can appear to be suffering from insect damage. An inspection of the damage pattern will distinguish leaves damaged by weather conditions from those damaged by insects. With weather-damaged leaves, there is no pattern to the damage and the holes in the leaf are jagged. Leaves with wind damage may also have straight-line rips in the tissue. If leaves are damaged while still in the bud, a uniform pattern may appear as they unfurl. Although in some cases, this damage may be initiated by insects feeding on the bud, we should avoid always placing blame for the damage on insects. In many cases it's actually the fault of Mother Nature. *(John Lloyd)*

PLANT DISEASES

Anthracnose Update

Sycamores in central Illinois have not disappointed pathologists this year—these trees are heavily infected with anthracnose. What many of us mistook for late leafing out was actually anthracnose killing the first set of leaves. The later leaves are now beginning to unfurl, and shoot blight is very evident. Don't worry, though—the infected leaves will fall, and new growth will soon provide shade below the sycamores (not to mention many leaves to rake in the fall). Although sycamores are infected each year, the species still manages to thrive. Concerned growers may want to provide supplemental water in periods of drought, then leave the trees alone.

We have also found a fairly severe case of ash anthracnose in the Champaign-Urbana area. Ash trees tend to react to leaf loss much harder than sycamores do, but again, they will fill in with warmer weather. Deep root watering will be particularly helpful for ash trees.

For more information about anthracnose, see the article on anthracnose of shade trees in Issue No. 4 of this newsletter. *(Nancy Pataky)*

Cytospora Canker of Spruce

Spruce trees in the Midwest seem to have taken a beating over the past year. We've received complaints about stressed or poorly growing spruce trees from most areas in Illinois; newsletters from both Ohio and Indiana report similar problems. The causes are many, but tend to be environmental: compacted soil and extremes in water availability and temperature. Another common cause of spruce stress is the spruce spider mite.

Stressed spruce trees are quite susceptible to Cytospora canker, which is probably the most common and damaging infectious disease of spruce in Illinois. Colorado blue and Norway spruce are very susceptible, especially 10- to 20-year-old trees. This disease appears on the spruce as dead or dying branches, usually starting at the base of the tree and moving upward. Occasionally the affected branches will be scattered throughout the tree. The needles may drop early from affected branches or could hang on for several months, leaving dry, brittle twigs. The disease can continue to spread until all the branches or the entire tree is dead. Conspicuous patches of white resin commonly form on the bark in the cankered areas. The diseased tissue is brown under the thin layer of outer bark. Black pinhead-sized fruiting bodies of the fungus (pycnidia) form in the inner bark, often embedded in the resin.

Don't be fooled when diagnosing Cytospora canker. The mere presence of dead branches does not confirm Cytospora. Look for resin areas at the base of the dead branches. Then look even further for black pycnidia. We have seen so much damage to spruce from environmental stress this past year that it is possible the injury has nothing to do with an infectious agent. On the other hand, stressed spruce trees are more susceptible to Cytospora canker, and it is highly likely that the disease will eventually invade the stressed tree as a secondary pathogen.

There are no chemical controls to prevent or eradicate this disease. Remove dead branches as they occur, but be certain to wait for dry weather for this

pruning. Try to improve tree vitality by watering in drought stress periods. It may be helpful to apply an organic mulch under the full spread of the branches but not up against the trunk. The mulch will help retain moisture and maintain a more even temperature and moisture environment for the roots. For more information on Cytospora canker of spruce, consult *Report on Plant Diseases* No. 604. *(Nancy Pataky)*

Red Thread of Turf

This fungal disease is commonly associated with cool, damp weather in spring and fall. This year is no exception. Weather conditions have been ideal for red thread development in many areas of Illinois.

Laetisaria, the fungus that causes this disease, forms conspicuous, pale-to-bright coral-pink, orange, or red threadlike masses on the grass blades and leaf sheaths. In the morning dew, the color is even more evident. As the disease progresses, blades die from the tip downward. The diseased turf is eventually bleached tan, yellowed, or scorched in circular to irregular patches. These patches may be anywhere from one to two inches in diameter. Because the dead leaves are generally interspersed with apparently healthy leaves, the turf will appear scorched and ragged. If that is the case, examine the turf in the early morning to confirm or rule out this disease.

Red thread rarely kills turfgrass plants, but it may weaken them and contribute to decline or infection by other diseases. The disease is particularly prevalent on slow-growing, nitrogen-deficient turf. Other conditions favorable for red thread are excess thatch, low soil calcium levels, water stress, a sudden drop in temperature, and misused herbicides. Correcting these stress factors will help control this disease. Often a fertilization treatment will correct the problem, but red thread may occur even in well-fertilized lawns.

If you have a problem with this disease, put the mower bag back on the mower and collect the clippings. Because the fungus remains viable on the clippings, you should remove the inoculum from the lawn. Some bluegrass varieties with resistance to the red thread fungus are listed in *Report on Plant Diseases* No. 413. Check with your local seed source for availability of other resistant varieties.

Chemical options are not the usual course for red thread control, but some are available for that use and are listed in the *1997 Illinois Commercial Landscape and Turf Pest Management Handbook.* Fungicides must be initiated when the disease is first evident and must be repeated at 7- to 21-day intervals during moist weather when daytime temperatures average 65°F to 75°F. *(Nancy Pataky)*

Vinca Stem Blight

In areas of the state where rain has been heavy or where regular watering is practiced, a common problem that will soon appear is stem blight of *Vinca minor* (periwinkle or ground myrtle). This stem blight is a fungal disease caused by *Phoma exigua* var. *exigua.*

Vinca stem blight causes rapidly expanding, dark brown to black girdling lesions on the stems. New shoots grow over the infected canes, so look under new growth to detect *Phoma.* Lesions appear at the stem base on new shoots and at nodes along runner stems, especially where the stems contact the soil. The stems then wilt, turn brown to black, and die, becoming obvious to the homeowner.

The fungal pathogen commonly colonizes dead or dying plant material. It is believed to overwinter as dormant mycelia and as pinhead-sized, brown to black fruiting bodies (pycnidia) on the dead stems and leaves. When establishing a bed of vinca, carefully inspect new plants for the lesions and pycnidia described. Use only clean plants from a reputable nursery.

Because this disease thrives in wet locations, water only enough to maintain plant vigor. Incidence of the disease will taper off during the hot, dry conditions of summer, but new infections may occur any time from June through August following prolonged periods of cool, wet weather. Mancozeb and many copper fungicides are registered for use against this stem blight. Carefully read the label for crop clearance before purchasing such a product. For more information on this disease, refer to *Report on Plant Diseases* No. 640. *(Nancy Pataky)*

Home, Yard and Garden Pest Newsletter *is prepared by Extension specialists from the University of Illinois at Urbana-Champaign and the Illinois Natural History Survey. Information for this newsletter is gathered with the help of staff members, Extension field staff, and others in cooperation with the USDA Animal and Health Inspection Service.*

Major authors are Phil Nixon, (217) 333-6650, John Lloyd, (217) 333-6653, and Fredric Miller, (708) 352-0109, entomologists; Nancy Pataky, plant pathologist, (217) 333-0519; and Rhonda Ferree, Tom Voigt, and David Williams, horticulturists, (217) 333-0350. Phil Nixon is the executive editor of the Home, Yard and Garden Pest Newsletter. *This newsletter is written by faculty in the Department of Natural Resources and Environmental Sciences and the Department of Crop Sciences. The newsletter is edited by Peggy Currid, typeset by Oneda VanDyke, and proofread by Herbert Morgan, all of Information Services.*

COOPERATIVE EXTENSION SERVICE

HOME, YARD & GARDEN PEST NEWSLETTER

college of agricultural, consumer and environmental sciences, university of illinois at urbana-champaign ▲ illinois natural history survey, champaign

No. 7 • June 4, 1997

This newsletter is issued weekly (biweekly in the early spring and late summer) to provide timely information on insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

INSECTS

Scouting Report

Cool temperatures during the past week have restricted the development of insects throughout the state. The scouting report in the previous issue of this newsletter should still suffice for this week's pest problems, although most of the pests discussed in that issue will be present slightly farther north in the state. Key pests to be treated are lilac/ash borer in northern Illinois, bronze birch borer in southern and central Illinois, European pine sawfly in central and northern Illinois, euonymous scale in southern and central Illinois, and spruce spider mite, oystershell scale, and pine needle scale throughout the state. *(Phil Nixon and John Lloyd)*

A Galling Situation!

Every year about this time, people start noticing bumps or other abnormal growths on their trees and shrubs. These abnormal growths, called galls, can be very disturbing to the people whose plants are affected. Fortunately, most galls affect only the appearance of the trees and are not detrimental to plant health.

Galls are a plant's response to insects, mites, bacteria, fungi, or nematodes. Galls are actually created by the plants themselves in response to some stimulus from the invading organism. In the case of insect and mite galls, they are the plant's natural response to these pests' feeding. Feeding damage and insect secretions initiate the production of normal plant growth hormones within the plants. These hormones produce abnormal cell growth, which results in the development of galls. For gall formation to occur, the stimulus (in this case, feeding) must be initiated when leaves or other plant parts are growing rapidly. Hence, the development of galls in the spring.

Once the galls have been initiated, nothing can be done to prevent their development. Even if the insect or mite is removed, the plant will continue to produce the gall tissue.

Many species of mites, wasps, midges, aphids, and psyllids can initiate plant galls. These creatures benefit from galls, which form barriers around the immature stages of the pests and protect them from predators, pesticides, and adverse environmental conditions. The gall makers feed on gall tissue produced in response to their feeding. So, in a way, the gall makers cause the plant to create a smorgasbord for feeding.

Despite the protection of a gall, some natural enemies of gall makers manage to circumvent these plant-made defenses and attack the gall makers inside. When dissecting insect-initiated galls, it is not uncommon to discover the larvae or pupae of parasitic wasps dining on the gall makers.

Gall-inducing insects and mites have species-distinct galls. Identification of the gall maker is based on the gall it produces. Over 2,000 types of galls on trees are produced by insects. The majority of these insect galls are produced by wasps, and over 700 of these wasp-produced galls occur on oak trees.
Of the galls found on trees, leaf galls on the petiole and upper or lower leaf surface are the most common. These galls appear as leaf curls, blisters, nipples, or hairy growths. Although leaf galls may be unsightly, the majority do little or no damage to the host plant. For most leaf galls, management is unnecessary and

ACES College of Agricultural, Consumer and Environmental Sciences, University of Illinois at Urbana-Champaign

Helping You Put Knowledge to Work—State • County • Local Groups
U.S. Department of Agriculture Cooperating
The Cooperative Extension Service provides equal opportunities in programs and employment.

impractical. Chemical control of leaf galls is difficult, if not impossible. Control to prevent galls must be initiated before gall formation begins. Treatment after gall formation is initiated may kill the gall maker, but the gall will continue to grow. Treatments to control leaf galls may aggravate the problem by killing the natural enemies that regulate the gall maker populations, which will increase gall problems in the future.

Galls that occur on woody portions of plant materials can cause more of a problem for tree health and appearance than leaf galls do. Unlike leaf galls, woody galls are not removed with leaf fall. Old galls that no longer contain the gall makers remain on branches and twigs and can reduce growth beyond the gall in future years. In some cases, these galls will even girdle the branch. Pruning out these galls when they are still green and destroying them is the primary form of management. In addition, pruning out the newly forming galls might help reduce the probability for infestations in subsequent years.

Only in severe situations is chemical management with an insecticide a viable option for controlling gall makers. Insecticidal management must be initiated prior to budbreak, during leaf expansion, or at other times when the pests are active. This timeline for treatment is extremely short and, in many cases, impractical.

It has yet to be determined whether new injection technologies and systemic insecticides will provide any reduction in gall production on infested trees. To prevent gall formation, insecticides administered through injection must remain active prior to the insect feeding. The malformed tissues of the gall may affect the ability of the insecticide to reach the tissues upon which the insects or mites are feeding. As information on the effectiveness of these types of treatments becomes available, we will share it with you.

The *1997 Illinois Commercial Landscape and Turf Pest Management Handbook* contains chemical and nonchemical management recommendations for the most common galls that attack trees in Illinois. *(John Lloyd)*

PLANT DISEASES

Damping-Off or Seedling Blights

Seedling diseases are usually most severe under conditions that slow the growth of young plants, including cool soil temperatures, overly wet soils, and poor seed quality. Although we may be able to control the last factor, nothing can be done about the cool, wet spring we've had. Many of us planted seeds in gardens, assuming that temperatures would soon warm up. Cool temperatures have persisted, wet weather has prevailed and, as a result, seedling blights have been common.

All species of plants grown from seed are susceptible to one or more of the soil-borne fungi capable of causing damping-off of seedlings. Both in the field on direct-seeded crops and in the greenhouse during the production of transplants, damping-off can be a serious problem. Plants wilt and die suddenly, sometimes before emerging from the soil (preemergence damping-off), and sometimes after emerging from the soil (postemergence damping-off). Symptoms can include root rot, stem lesions, and general seedling wilt. At this time of year, the problems are seen in vegetable plantings and flower beds.

It is well worth the money to use high-quality seed that will germinate quickly and allow plants to rapidly become established. Mature seedlings are more resistant to seedling blights than young seedlings are. If possible, buy seeds or transplants certified as disease free. Many commercially produced seeds are treated with broad-spectrum fungicides, such as captan or thiram, to help protect the seeds and young seedlings from fungi. This protection lasts for only a week or two after planting. Because our weather has remained cool and wet for over three weeks, even the treated seed may have problems.

Choose a planting site that is well drained and without a history of seedling disease problems. Plant when soil temperatures and moisture conditions favor quick germination and plant growth. Using raised beds may help improve soil drainage and increase soil temperatures to allow rapid growth.

Fungicides, applied at planting or transplanting, are registered for controlling seedling diseases on some vegetable crops, such as snap beans, peas, and peppers. Many ornamental plants may be treated as listed by host in the *1997 Illinois Commercial Landscape and Turf Pest Management Handbook*. As with most disease control, the fungicide treatments of seeds are intended to protect against the damping-off fungi. You cannot wait for the problem to occur before you treat.

Further information on damping-off diseases is available in *Report on Plant Diseases* No. 615, Damping-off and Root Rots of House Plants and Garden Flowers, as well as No. 916, Damping-off and Seedling Blights of Vegetables. *(Nancy Pataky)*

Volutella Leaf and Stem Blight of Pachysandra

The shade-loving ground cover pachysandra has played host this year to a particularly devastating fungal disease called Volutella blight. The disease may begin as brown blotches on leaves, but progresses through stems and stolons, causing cankers that girdle and kill stems. The disease often follows some type of stress, such as winter injury, insect infestation, sun scald, or recent shearing.

Look for wilted pachysandra plants with brown blotches on the leaves. Push back the leaves to find the blotches and cankers on stems. Infected stem cankers will be damp and have pinhead-sized, salmon-pink spore masses. Remove and destroy any severely infected plants. (Do this when plants are dry, if you can wait.) Chemicals may be used as protectants; repeat applications are necessary at 10- to 14-day intervals. Chlorothalonil, copper fungicides, Duosan, Fore, mancozeb, and Zyban are registered for this use on pachysandra.

It is also helpful to keep insects under control and to mulch pachysandra with a material that does not hold moisture. Pruning any surrounding plants for better air movement in the area may also help manage this fungus. Consult *Report on Plant Diseases* No. 649 for additional information. *(Nancy Pataky)*

Crabapple Scab

We have not placed much emphasis on this disease in 1997, partially because it was so devastating last year and received so much press, and partially because the scab has been slow in developing this year. Apple scab is a fungal disease that causes serious injury to apples and crabapples. Similar fungi cause scab on cotoneaster, firethorn, hawthorn, mountainash, pear, quince, and a few other species. The economic loss to ornamentals may not justify the expense of fungicidal sprays every year, but fungicides can provide valuable assistance to the fruit grower.

The first infections usually appear on the undersurface of flower sepals or flower cluster leaves. Infections appear as small, irregular spots that are light brown to olive green. These spots enlarge to become circular, velvety, and olive green. Spots blacken and cause the leaves to become dwarfed, curled, and often scorched. Leaves eventually turn yellow and drop from the trees. Central Illinois growers are seeing the velvety spots spreading across susceptible leaves now, but defoliation has not begun. Infection levels this year are not nearly as severe as they have been in the past two years.

A grower cannot wait for symptoms to develop before starting a spray program. As we have preached in the past, sprays must begin at budbreak to protect new leaves as they emerge. Many fungicides are registered for this use. Recommendations for ornamental hosts are listed in the *1997 Illinois Commercial Landscape and Turf Pest Management Handbook.*

After two years of dealing with severe scab, growers should consider replacing susceptible trees with one of the many scab-resistant choices. (Refer to *Report on Plant Diseases* No. 803 for resistant variety suggestions.) Also, choose a variety that is resistant to cedar apple rust and powdery mildew, two other common diseases of apple and crabapple trees. *(Nancy Pataky)*

Verticillium Wilt

Maples, smoke tree, and magnolia have been the most popular hosts for Verticillium wilt at the plant clinic in recent years. However, more than 300 plants (including weeds) are susceptible to this fungal disease. The soil-borne *Verticillium* fungus is now active, and tends to invade weakened or stressed plants more often than it does healthy, vigorous plants. It invades plants through wounds above or below ground. Once introduced into the soil, the fungus can survive for five years or longer, so identification of the problem is important when considering replanting in the same spot.

Symptoms include wilting and yellowing, as well as the death of leaves, branches, or entire plants. Chronic symptoms may follow: stunted, chlorotic, and deformed foliage; leaf scorch; slow growth; abnormally heavy seed crops; and dieback of shoots and branches. The vascular tissue is discolored, usually brown, black, or light to dark green. In terms of diagnosis, this factor is most significant. Samples taken for laboratory cultures must contain this discoloration for valid results. Tissue must be alive but showing active wilting.

Resistant varieties are available for a few plants, such as strawberry and tomato. Thorough watering and proper fertilizing to promote vigorous growth often aids affected trees and shrubs. Most species will not readily recover from this disease, but maples have been known to "wall off" the fungus within the wood when growth is rapid. Do not grow susceptible crops

on land where crops that proved susceptible to Verticillium wilt were grown previously. A rotation of five years or more for vegetables and flowers may help reduce the amount of inoculum in the soil. For more information, including lists of susceptible and nonhost crops, plus additional control measures, read *Report on Plant Diseases* No. 1010. *(Nancy Pataky)*

HORTICULTURE

Command Herbicide—Off-Target Drift

Although I don't know of any specific incidences of Command herbicide injury, it certainly may be occurring in Illinois. The May 27, 1997, *Indiana Educator Update* from Purdue's Plant and Pest Diagnostic Clinic indicated that they have recently received from commercial growers and homeowners samples of ornamentals, flowers, and vegetables with symptoms (such as bleached foliage) of Command herbicide injury. In each case, Command had been applied to a soybean field somewhere in the area, but not necessarily adjacent to the affected plants.

Command is a herbicide that controls various annual grasses and certain broadleaf weeds, such as velvetleaf, in soybeans. Last year, a new formulation of Command was introduced. The new product is used as a preemergence treatment and does not require immediate incorporation into the soil. This formulation, known as Command 3ME, is a microencapsulation of the active ingredient, clomazone.

Command 3ME does not require incorporation because it is not as volatile as the old "EC" formulation. However, off-target injury to susceptible plants may still occur from 3ME. Even though the 3ME product is less volatile than the old product, spray pressure, particle size, nozzle type, boom height, and high winds can all cause off-target drift of this (and other) herbicides on the day it is applied.

Applicators must be cautious when applying this product near sensitive plants, particularly on days with gusty winds. In fact, the Command 3ME label warns not to apply it on days with winds in excess of 10 mph. Also, the label prohibits the use of this product within 1,200 feet of towns, housing developments, commercial fruit or vegetable production, and commercial greenhouses or nurseries.

If Command injury symptoms are evident on plants grown for food, such as garden vegetables and strawberries, the fruit should not be consumed, because this is considered an off-label application. *(Rhonda Ferree)*

Home, Yard and Garden Pest Newsletter *is prepared by Extension specialists from the University of Illinois at Urbana-Champaign and the Illinois Natural History Survey. Information for this newsletter is gathered with the help of staff members, Extension field staff, and others in cooperation with the USDA Animal and Health Inspection Service.*

Major authors are Phil Nixon, (217) 333-6650, John Lloyd, (217) 333-6653, and Fredric Miller, (708) 352-0109, entomologists; Nancy Pataky, plant pathologist, (217) 333-0519; and Rhonda Ferree, Tom Voigt, and David Williams, horticulturists, (217) 333-0350. Phil Nixon is the executive editor of the Home, Yard and Garden Pest Newsletter. *This newsletter is written by faculty in the Department of Natural Resources and Environmental Sciences and the Department of Crop Sciences. The newsletter is edited by Peggy Currid, typeset by Oneda VanDyke, and proofread by Herbert Morgan, all of Information Services.*

COOPERATIVE EXTENSION SERVICE

HOME, YARD & GARDEN PEST NEWSLETTER

No. 8 • June 11, 1997

This newsletter is issued weekly (biweekly in the early spring and late summer) to provide timely information on insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

PLANT DISEASES

Scouting Update

Many of the diseases that we have discussed over the last several weeks are now in full bloom. Cool conditions have slowed plant growth and allowed fungi to infect and pervade plant tissue. Wet conditions in many parts of Illinois have also provided ideal conditions for fungal growth.

Leaf spot diseases are prevalent over most of the state. At the clinic, we have seen anthracnose on sycamore, maple, ash, and elm. Strawberries have their share of leaf spots again this year, with **common leaf spot** the most prevalent so far.

Scab is beginning to cause problems on susceptible crabapples, most recently as leaf yellowing.

Peach leaf curl has many peach growers concerned, and the closely related **leaf curl of oak** has been common, at least in central Illinois.

Rhizosphaera needle cast on spruce has caused needle purpling and needle drop in all parts of Illinois.

Cedar quince rust has been identified on hawthorns throughout the state, causing stem swellings and cankers.

Red thread is the predominant turf disease we have been dealing with.

Watch for **Guignardia leaf blotch** on horsechestnut. Also watch for **Verticillium wilt** on trees that have had problems in the past. The clinic also identified a case of **pine wilt** this past week. *(Nancy Pataky)*

Pine Wilt

Pine wilt is caused by the pinewood nematode. It is vectored (spread) by the sawyer beetle and a few related long-horned beetles. Many readers of this newsletter probably think of nematodes as soil or root pathogens, but the pinewood nematode lives in the wood of the tree. The nematode is microscopic and blocks water-conducting tissues, causing a wilt similar to the fungal wilt diseases. Although the nematodes are too small to be seen, the symptoms of infection can be observed.

Pine wilt causes a sudden decline and death of the entire tree within a few weeks or months after the first sign of disease. Symptoms actually occur in four stages: needles first appear light grayish green, then yellowish green, then turn yellowish brown, and finally turn completely brown. On affected trees, this color change can occur branch by branch or over the entire tree. However, on Austrian pine, we have seen cases in which trees tested positive for pine wilt but initially showed symptoms on branch tips only.

Pines with root problems, water-related stress, or cold injury will decline from the top downward. The decline could also start at the bottom of the tree and move up, or possibly start in branch tips and move inward. Needle color, however, does not progress from grayish green to brown. Instead, necrosis is fairly quick.

Samples to be tested for pine wilt should be sent to the Plant Clinic or another lab where a nematologist is available. Our fee is $15.00. Branch samples should be one to two inches in diameter and long enough to put into a vise so that wood discs can be cut from both ends of the branch. Because the pinewood nematode is not uniformly distributed within a tree, we find that the most reliable samples are from branches that have brown needles still attached.

No effective chemical controls exist for either pine wilt or its vector. Affected trees should be burned or buried to reduce reservoirs of infection. Recent

ACES College of Agricultural, Consumer and Environmental Sciences, University of Illinois at Urbana-Champaign

Helping You Put Knowledge to Work—State • County • Local Groups
U.S. Department of Agriculture Cooperating
The Cooperative Extension Service provides equal opportunities in programs and employment.

research shows that it is probably safe to chip the trees for mulch. Still, you might want to compost the mulch before use or spread it out to dry before placing it near pines. Prune dead branches from live trees to minimize attractiveness to beetle feeding. Beetles that emerge from the dead wood may carry the nematode and fly to healthy pines several miles away. When beetles feed on a healthy pine, they may transmit the nematode to the healthy tree through feeding wounds. The nematode enters the resin canal and eventually clogs the water transport system of the tree.

Replace dead pines with Norway or blue spruce, Douglas-fir, cedar, hemlock, or other nonsusceptible species. Consult *Report on Plant Diseases* No. 1104 for details about pine wilt disease. *(Nancy Pataky)*

Black Knot of Plum and Cherry

Some concern was expressed about this disease at a recent disease training session in northern Illinois. Black knot is a rather ugly disease, but it can be controlled with fungicide applications and pruning. The causal fungus, Dibotryon morobosum, can infect at least two dozen species of cherries, plums, and other members of the Prunus genus, including some ornamental species.

Black knot causes elongated, rough, girdling, black swellings on twigs, branches, and sometimes even the trunk. The knots are a velvety olive green in the spring; they gradually become hard, brittle, and coal black. If stems become girdled, dieback is evident. The trees weaken and may die unless effective control measures are taken.

Purchase only disease-free nursery stock. Never buy trees with visible knots or abnormal swellings on the twigs and branches. Look for this disease in its early stages, when it appears as light brown swellings that later rupture the bark and turn darker. Prune and burn (or bury) all infected wood in late winter or early spring before growth starts and as soon as new knots appear. Make cuts four to eight inches behind any obvious black-knot swellings. Use a knife and chisel to carefully cut away knots on the trunk and large limbs—remove about an inch of healthy bark and woody tissue beyond any visible gall tissue. If possible, destroy (burn) all wild, neglected, or worthless plum and cherry trees.

Most infections of black knot occur between budbreak and two weeks after bloom, when wet conditions are accompanied by temperatures ranging from 55°F to 77°F. For effective protection against this fungus, apply fungicide sprays when buds open and repeat the spray every two weeks until about three weeks after petals fall. These early season fungicide sprays are protectants: they will help prevent new infections but will not stop infections already present on the tree. Recommendations are listed in the *1997 Illinois Commercial Landscape and Turf Pest Management Handbook.*

The only product that we can recommend for homeowners is copper. There are many formulations of copper, so read the label carefully to be certain that the formulation you choose is registered for the host tree that you have. Also be sure that the product is specifically labeled for use against the black knot fungus. In addition to chemical treatment, all visible knots must be pruned from the trees to remove old infections.

For more information concerning this disease, consult *Report on Plant Diseases* No. 809, Black Knot of Plums and Cherries. *(Nancy Pataky)*

Leaf Spots of English Ivy

English ivy is a hardy vine that works well in shady locations; however, it is frequently attacked by bacterial leaf spot and stem canker, as well as a few fungal leaf spots.

Bacterial leaf spot and stem canker is more common than fungal leaf spots, although the fungal diseases have been seen this season. Bacterial leaf spot first appears as small, circular, dark-green, water-soaked (oily) lesions on the leaves. As these lesions enlarge, they have reddish brown to black centers with a water-soaked margin and sometimes a yellow halo. The spots also crack with age. In warm, wet weather, the bacterium causes black cankers on the stems and petioles; stems die, often with black tips.

The fungal leaf spots are caused by a variety of fungal species. They cause round to irregular spots in a variety of colors. Often a series of concentric rings can be seen in the spots. Look closely on the spots for small black specks, which are fruiting structures containing spores of fungi. Bacterial spots do not have fruiting structures because bacteria do not form spores.

If you establish a bed of ivy this year, look closely at new plants to be certain that you do not introduce diseased plants. Remove any questionable leaves or stems. It is also a good idea to remove old leaves and debris from the beds each spring before new growth starts. Because these diseases require water on the

foliage to infect the blades, water the soil rather than the foliage when possible. Water early in the day so that wet foliage will dry quickly.

If fungal leaf spots have been severe in the past, apply fungicides when new leaf growth begins in the spring. Registered chemicals are listed in the *1997 Illinois Commercial Landscape and Turf Pest Management Handbook.* Because the chemicals are protectants, they usually require repeat applications every seven to ten days as long as wet weather persists in the spring and early summer.

Few chemicals protect plants from bacterial leaf spot and stem canker. The copper compounds and Chipco Aliette may help. Try to improve air movement in the area by thinning the stand and pruning surrounding plants. Never work with the plants when they are wet. For more information about these diseases, consult *Report on Plant Diseases* No. 652, Leaf Spot Diseases of English Ivy. *(Nancy Pataky)*

INSECTS

Scouting Report

Bronze birch borer adults have emerged in the Chicago area according to scouts at the Morton Arboretum. Female beetles will soon begin laying eggs in rough portions of the bark or branch crotches of susceptible birch trees. (This egg-laying is already occurring in southern sections of central Illinois.)

Trunk and limb treatments with chlorpyrifos (Dursban) will provide a residual barrier that will kill hatching larvae as they attempt to burrow into the tree. To help prevent bronze birch borer problems, avoid using birches in the landscape, or select less susceptible varieties such as heritage, whitespire, or river birch. In established landscapes, it is imperative to provide susceptible trees with adequate amounts of moisture through the use of frequent irrigation or mulching. Regardless of maintenance practices, realize that in urban landscapes, birch is a fast-growing, short-lived species that will eventually succumb to bronze birch borer and need to be replaced.

Bruce Spangenburg of the Grayslake Extension Center has reported **sod webworm** activity in McHenry County. Although webworm activity may seem early given the unusually cool weather, we might see a problem with that pest in areas (such as the northern third of Illinois) that have not received as much rain as we have in central Illinois.

Usually the first generation of sod webworm does little or no damage because spring rains keep turf healthy and provide a good environment for webworm pathogens. Second- and third-generation webworm feeding is the primary source of turf damage during drier weather when the turf is not as lush. If damage is noticed early in the season, management with a surface insecticide should provide adequate control.

The little "splatters" across windshields on vehicles throughout central Illinois are actually **potato leafhopper** guts. Potato leafhoppers are feeding on new soybeans that are popping up in fields throughout the area and should soon be causing damage on susceptible ornamental plants. Although physical destruction at 55 mph effectively kills some of the leafhoppers, the spottiness of this method will not significantly reduce their overall numbers. To prevent the symptomatic leaf discoloration and shoot injury associated with leafhopper feeding, begin insecticidal management when leafhoppers are noticed on red maple, euonymus, and other susceptible plants. Synthetic pyrethroid insecticides (such as Talstar, Tempo, and Scimitar) will provide adequate control of this pest. *(John Lloyd, Phil Nixon, and Fred Miller; Karel Jacobs of the Morton Arboretum)*

Scales

The crawlers of **pine needle scale, euonymus scale, European elm scale,** and the brown race of **oystershell scale** are still active in northern regions of Illinois. Scale crawlers are extremely sensitive to most management measures. Most insecticides and less toxic alternatives (insecticidal soaps and summer oils) will provide good control of the crawlers before the pests settle down. Treatments with insecticides should be repeated twice at ten-day intervals for all scales. For areas in southern Illinois, where the crawlers have settled down, management techniques should focus on the next period of crawler activity.

Pine needle scale crawlers will reappear in early to mid-July in southern and central Illinois, usually when the blooms on hills of snow hydrangea turn from white to green. Shake branches over a white surface and look for moving little red dots to determine if pine needle scale crawlers are present. Second-generation crawlers of euonymus scale also occur in early to mid-July. Crawlers of the gray race of oystershell scale should be present now that Spirea vanhouttei has finished bloom-

ing. A second generation of oystershell gray race crawlers will appear in southern and central Illinois in early August. *(John Lloyd)*

Caterpillars

Larvae of **white-marked tussock moth** are hatching all over southern and central Illinois. When the caterpillars are in their early stages of development, they appear as nondescript, fuzzy little "moving lines." It is difficult to distinguish these larvae from those other caterpillars, even with a hand lens or dissecting scope. The best way to identify them is to look at the egg mass. Most defoliating caterpillars have distinct egg masses. White-marked tussock moth eggs are located in a fluffy white mass that is usually attached to fine branches. Insects That Feed on Trees and Shrubs (Johnson and Lyon) contains many good pictures of common defoliating caterpillar egg masses.

Cankerworms are still causing defoliation in northern counties of Illinois. Populations do not appear high enough to cause significant defoliation; however, some leaf damage is evident on most elm and honey locust trees in the Chicago area.

According to Joe Boggs at The Ohio State University, **bagworms** are starting to hatch in the Cincinnati, Ohio, area. Scouts in southern Illinois should be on the lookout for the young larvae. When they hatch, young larvae feed on the upper epidermis of the leaf and build a upward-pointing bag around the leaf. As they mature, the larvae begin eating entire leaves and enlarge the bag, which causes it to hang down. Treatments for young larvae should be initiated after the eggs have hatched and the larvae have finished dispersing by ballooning. This usually occurs two weeks after the first hatch.

Bacillus thuringiensis var. *kurstaki* (Dipel, Thuricide, etc.) is a good control for all of these caterpillars when they are young. *(John Lloyd)*

Aphids on Maples

Aphids are present in large numbers on maple trees in several areas of the state. Specimens collected on sugar maple in Aledo in northwestern Illinois were identified as Neoprociphilus aceris by Dr. David Voegtlin of the Illinois Natural History Survey. This aphid hatches out in the spring on maple and then migrates to cat briar (*Smilax*). These aphids will probably be present for only two or three weeks before leaving maples for the rest of the year.

Aphids similar in appearance to *Neoprociphilus aceris* (probably the same species) occur in several areas of the state in late spring in some years. These aphids produce profuse amounts of honeydew, which drips out of trees and onto cars, sidewalks, and unsuspecting humans. Maple leaves that are attacked may wilt and turn yellow. After a few weeks, the aphids disappear.

Because these aphids occur on maple for only a short time in huge numbers, they tend to overwhelm natural enemies such as lady beetles, parasitic wasps, lacewings, and syrphid flies. In any case, by the time that the population of natural enemies is sufficient to control aphids, the aphids are leaving the maples.

A variety of insecticides is available and will provide control. Insecticidal soap may be one of the most useful products because it kills aphids on contact, is low in toxicity, and tends to wash some of the honeydew off the trees. In many cases, rather than apply insecticides, it may be best to wait a few weeks for the aphids to migrate. *(Phil Nixon)*

Gypsy Moth Traps

The Illinois Department of Agriculture, in cooperation with the U.S. Department of Agriculture Animal and Plant Health Inspection Service, is setting traps for gypsy moths in the northern half of Illinois. The trapped area extends from the northern edge of Sangamon County northward through the rest of the state. The traps are being placed during June and will be removed by the end of August.

Gypsy moth traps are triangular and approximately six inches long by three inches wide. Traps are placed on one-mile grids and are made of lime green, reddish orange, or tan cardboard. The inside of the trap is coated with sticky glue, which catches and holds moths. A synthetic pheromone is placed inside each trap. This pheromone mimics the one produced by the female moth to attract the male. No insecticide is used.

Male gypsy moths are attracted to the traps from more than half a mile away. Their presence in newly placed traps alerts Department of Agriculture officials to a possible problem. Trapping in subsequent years allows an invading population to be located and eradicated. Because many moths other than the gypsy moth are attracted to the trap, the mere presence of moths in the trap does not necessarily indicate a problem.

If you notice traps in your area, leave them alone. If one is on a tree, post, or other object that must be removed, contact the Illinois Department of Agriculture at (847) 294-4343 or (217) 785-2427. *(Phil Nixon)*

Rose Pests

A variety of pests attack roses: aphid, rose midge, roseslug, Japanese beetle, leafcutter bee, slug, and two-spotted spider mite. Their relative importance depends on the grower and the growing situation.

Several species of aphids attack rose buds, leaves, and stems. In many situations, lady beetles and their larvae, lacewing larvae, syrphid fly larvae, and other predators, as well as parasitic wasps, will control aphids without the use of insecticides. However, the use of insecticides to control or prevent other pests may kill beneficial insects and make aphid control a necessity. Insecticidal soaps and other chemical insecticides can provide effective control.

Rose midge larvae tunnel through the leaf and flower buds, causing them to die and turn brown. The tiny fly larvae are white, legless, and about 1/16 inch long. They drop to the soil to pupate, emerging as pinhead-sized yellowish to reddish flies. Rose midge is very spotty in distribution—many growers have fortunately never seen it. Some growers have been successful in eliminating rose midge by aggressively removing attacked buds and/or placing plastic sheeting over the soil to catch larvae dropping from the plant to pupate. Larvae that fall on the plastic will dry out and die. Rose midge has a two-week life cycle that recurs throughout the growing season. This short life cycle allows it to develop insecticide resistance very rapidly. Insecticidal control is directed at both the flies laying eggs on the buds and the larvae dropping to the soil. The use of several different insecticides in a rotation as both foliar and soil treatments usually results in some control. Try anything that is labeled, and do not rely on just one or two insecticides.

Roseslug is a sawfly that occurs in the spring and feeds on rose leaves as larvae. The larvae are covered with a yellowish green slime and grow to about 1/2 inch long before dropping to the soil to pupate. When young, they feed through one epidermis and the mesophyll, leaving an epidermis intact, which turns brown. Older larvae may eat holes in the leaves. Roseslug is an uncommon insect in Illinois and can usually be controlled by hand-picking. Various insecticides are also effective.

Slugs can also attack rose leaves. These mollusks are brown or black, about 1/2 to one inch long, and slimy. Wherever they travel, they leave a slime trail. Slugs feed at night or during damp, cloudy, or foggy days. They leave irregularly shaped holes in the middle of the leaves. Slugs are usually a problem on low-growing roses that are heavily mulched. Removing the mulch normally reduces the slug problem. There are also slug baits that can be used. Insecticides are not effective, because these animals are not very closely related to insects and their physiology is different.

Japanese beetle adults cause heavy damage to rose leaves and blooms through July into mid-August. These 1/2-inch-long, stocky, metallic-green beetles with coppery wing covers are difficult to control. Carbaryl, sold as Sevin, will protect plants for about a week, so repeat applications are necessary. Rosarians growing show roses will usually put netting over buds or entire plants to protect them from Japanese beetle damage. Otherwise, some damage is inevitable.

Leafcutter bees cut 1/2-inch-diameter perfect circles in the leaves to use in lining their nests and dividing larval cells. Leafcutter bee populations are usually small, and the bees are important pollinators. For these two reasons, insecticidal or other controls are usually not used. Leafcutter bees will also tunnel into pruned rose canes to produce nests. This can be prevented by using putty or thumbtacks to seal the end of the stems at pruning time.

Two-spotted spider mites feed on the undersides of rose leaves, giving the upper surface a speckled and/or bronze appearance. This mite is most common during the dry weather of mid- to late summer. These insects are fed upon by predatory mites and insects. Heavy use of insecticides against some of the other rose pests mentioned in this article may kill beneficial predators, allowing two-spotted mites to thrive and cause heavy damage. Insecticidal soap is an effective control, but this pest will rarely be a problem if you avoid insecticide use. Damage that occurs in late summer or early fall can usually be ignored.

Some rose varieties tend to be attacked more by pests than others. Rugosa and other shrub roses and miniature roses tend to have fewer insect problems than some of the larger-flowered varieties. In my own yard, Japanese beetles are much more damaging to native American roses than they are to multiflora rose. (Could it be possible that the multiflora rose, which is Asian in origin, has some resistance to its evolutionary contempory, the Japanese beetle?)

Probably the most important factor in rose pest control is the grower's preference. A grower who allows some damage to foliage or blooms will use insecticides less often and will conserve natural enemies. The increased number of natural enemies will control some pests such as aphids and mites, reducing overall damage. When control is needed, hand-picking of pests and the use of insecticidal soap will have less of an impact on natural enemies than the use of most insecticides. *(Phil Nixon)*

MACH 2 Registered for Turf

RohMid, a partnership between American Cyanamid and Rohm & Haas, has announced that the U.S. Environmental Protection Agency registered MACH 2 as a legal pesticide on May 20, 1997. The active ingredient, halofenozide, is a molt-accelerating compound that interferes with the normal molting process.

Experimental tests have shown that MACH 2 is effective against white grubs (including annual white grub), Japanese beetles, and black turfgrass ataenius—taking about three weeks to provide control. It is also effective against such caterpillars as black cutworm, sod webworm, and armyworm—providing control in about four days. MACH 2 has a long-lasting residual and is a low-toxic pesticide (to humans). *(Phil Nixon)*

HORTICULTURE

Pesticide Safety Education Program Information

The 1996–1997 annual report on Illinois's Pesticide Safety Education programs is now available. The 20-page document highlights program goals and mission, program structure, benefits of the program, and major accomplishments, including educational material development, pesticide-container recycling, commercial PAT programs, private PAT programs, Worker Protection Standard (WPS), homeowner programs, drift-education activities, Operation Safe Fly-In workshops, and many other programs.

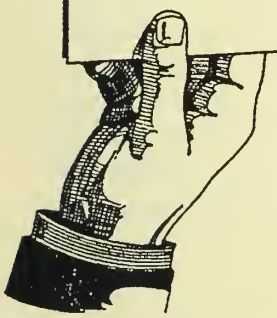
The report demonstrates the depth and breadth of Illinois's safety education programs. Although commercial and private PAT is the first mission of the pesticide safety program, it also provides pesticide education to a diverse audience in other pesticide-related areas.

If you would like a copy of the annual report, please contact Patty Bingaman at (800) 244-2363. The annual report is also available at The Pesticide Safety Education home page at http://www.aces.uiuc.edu/~pse/. This site contains the latest issues of the *Illinois Pesticide Review* newsletter, fact sheets, links to other resources, and pesticide applicator training schedules. (Although the training schedules are currently out of date, they remain on the home page because they provide useful information about licensing requirements and specifications.) Schedules for 1997–1998 commercial and private pesticide applicator training programs will be available this fall. *(Rhonda Ferree)*

Home, Yard and Garden Pest Newsletter *is prepared by Extension specialists from the University of Illinois at Urbana-Champaign and the Illinois Natural History Survey. Information for this newsletter is gathered with the help of staff members, Extension field staff, and others in cooperation with the USDA Animal and Health Inspection Service.*

Major authors are Phil Nixon, (217) 333-6650, John Lloyd, (217) 333-6653, and Fredric Miller, (708) 352-0109, entomologists; Nancy Pataky, plant pathologist, (217) 333-0519; and Rhonda Ferree, Tom Voigt, and David Williams, horticulturists, (217) 333-0350. Phil Nixon is the executive editor of the Home, Yard and Garden Pest Newsletter. *This newsletter is written by faculty in the Department of Natural Resources and Environmental Sciences and the Department of Crop Sciences. The newsletter is edited by Peggy Currid, typeset by Jerry Barrett, and proofread by Herbert Morgan, all of Information Services.*

Reference and Teaching Materials from the University of Illinois



Quality You Expect

Expertise You Want

ACES

College of Agricultural, Consumer and Environmental Sciences
University of Illinois at Urbana-Champaign

The *Illinois Commercial Landscape and Turf Pest Management Handbook* is a must for any horticulture professional or educator. Topics include management of weeds, insect pests, and diseases for

- turfgrass
- landscaping
- nursery crops
- woody ornamentals
- flowers, trees, and shrubs

using both chemical and nonchemical controls.
Revised Annually
ICLT-97 ..... *$8.00*

In pest and weed identification, pictures are worth a thousand words. The combination of high-quality information and superb photography makes these slide sets great teaching tools in classrooms or staff trainings.

Lawn Weeds-Identification and Control

76 frames with script
S650a *$39.85*

Takes the learner through a step-by-step approach to controlling weeds in turf.

Shade Tree and Woody Shrub Insects: Identification and Control
78 frames with script
S654.4 ..... *$40.85*

Turf Insects: Identification and Control
39 frames with script
S654.2 ..... *$41.85*

Two sets that help the learner identify pests, understand their life cycles and then select appropriate chemical and nonchemical controls to manage them.

Photo sheets make great identification tools. Photos on one side with descriptions and explanations on the back. Certainly an effective study aid for any student. High quality at a very reasonable price. Here's a sampling of what you can order:

- *Ornamental Insects* X698.16
- *Tree and Shrub Pests I* X698.17
- *Turf Pests I* X698.31
- *Tree Diseases I* X699.16
- *Tree Diseases II* X699.17
- *Tree Diseases III* X699.18
- *Woody Ornamental Diseases I* X699.30
- *Turfgrass Diseases I* X699.31
- *Turfgrasses for the Midwest* X699.35
- *Turfgrass Establishment in the Midwest* X699.36

$ .40 each

Looking for more resources?

Here are two World Wide Web sites packed with possibilities from the University of Illinois!

www.ag.uiuc.edu/~vista/catalog/catintro.html
www.aces.uiuc.edu/~vo-ag/

To order the *Illinois Commercial Landscape and Turf Pest Management Handbook, slide sets and photo sheets* call (217) 333-3871. MasterCard and Visa accepted. Bulk discounts available. Shipping is extra and may vary by order. Orders over $10.00 may be billed.

COOPERATIVE EXTENSION SERVICE

HOME, YARD & GARDEN PEST NEWSLETTER

college of agricultural, consumer and environmental sciences, university of illinois at urbana-champaign ▲ illinois natural history survey, champaign

No. 9 • June 18, 1997

This newsletter is issued weekly (biweekly in the early spring and late summer) to provide timely information on insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

INSECTS

Sucking Insects

Periodical cicadas have emerged in a small area of northwestern Illinois centered in Knox and Henderson counties. Cicadas are also expected to emerge in DeWitt and neighboring counties. Next year, periodical cicadas should emerge through most of the southern two-thirds of Illinois. Males will sing for about two weeks, attracting the females to them for mating. Egg laying by female cicadas will begin near the end of that two-week period and last for another week or two.

Use nylon netting, wire screening, or tree wrap to protect tree trunks that are two inches or less in diameter. Larger trees probably will not need protection. The degree of control offered by insecticides ranges from totally ineffective to only mildly effective against cicadas, so insecticide treatment is not recommended in most cases.

Honeylocust plant bugs are in later nymphal and adult stages throughout the northern half of Illinois and in the adult stage in southern Illinois. Leaflet distortion damage has already occurred and little will be accomplished by spraying now. If you are experiencing heavy damage, be ready to scout and treat soon after leaf emergence next year to avoid this season-long damage.

Ash plant bugs are numerous throughout the state and have been reported in Rockford and in northeastern and southern Illinois. Pyrethroid sprays may still prevent some damage, particularly in northern Illinois.

The **four-lined plant bug** is a 1/4-inch-long, greenish yellow, flat-topped sucking insect with four black stripes as an adult. The nymphs are reddish and tend to hide in growing tips and leaf bases. They suck juices out of mint and a wide variety of flowers including chrysanthemum, coreopsis, veronica, artemisia, salvia, black-eyed susan, astilbe, and cranesbill geranium. Their feeding causes blackish areas on leaves; severe infestations lead to dieback. The four-lined plant bug can be controlled with insecticidal soap and other labeled insecticides, particularly during its nymphal stage.

This year is developing into a major one for **potato leafhoppers,** which are quite numerous throughout the state on red maple, sugar maple, euonymous, and other trees and shrubs. Damage has been minimal, so treatment should prevent heavier damage from occurring. Pyrethroid insecticides such as Astro, Tempo, Talstar, and Scimitar should be very effective. Monitor leafhopper numbers on trees. These insects are such good fliers that re-treatments may be necessary after a couple of weeks.

Aphids are present in large numbers on spirea at the Morton Arboretum as well as in other areas of the state. These aphids cover stems and leaf undersides near branch tips. They produce large amounts of honeydew, making affected bushes shine from the light reflected from this substance on the leaves. By now, infestations usually have been colonized by ladybeetles, syrphid fly larvae, and parasitic wasps. For large infestations, look for these natural enemies before treatment; their presence in even moderate numbers will usually result in a major reduction in the aphid population within the next two weeks. Aphid infestations on spirea rarely need to be controlled because plant distortion seldom occurs and the honeydew isn't usually a nuisance. If treatment is

necessary, insecticidal soap or summer spray oil is less harmful than other chemicals to the natural enemies of aphids. *(Phil Nixon and Karel Jacobs, the Morton Arboretum)*

Mimosa Webworm

Be watchful for **mimosa webworm** on honey locust in southern Illinois. According to Don Orton's book, *Coincide*, moth flight occurs as mock orange (*Philadelphus*) is in bloom, with young larvae present when hills of snow hydrangea (*Hydrangea arborescens* 'grandiflora') is in full bloom. Mock orange has been in full bloom in central Illinois for about a week.

Mimosa webworm has two generations per year. The first generation is usually small in number and easily overlooked. The greenish, brownish, or grayish slender larvae feed on the leaflets of honey locust and mimosa (silk tree). When disturbed, mimosa webworm larvae move quickly and violently, which helps them escape. The first-generation larvae web two or three leaflets together and feed on the leaflet undersides. This feeding causes the leaves to appear silvery at first, particularly from a distance. As damaged areas dry, they turn brown. Large numbers of first-generation infestations scattered throughout a tree call for an insecticide application to reduce the more seriously damaging second generation.

The first-generation caterpillars pupate in the webbed leaves and emerge as small grayish moths. These moths mate and tend to lay eggs back into first-generation webbing. The second generation is usually much larger in number than the first. These caterpillars typically web together two to six compound leaves, causing damage that is much more obvious. Although treatment of the second generation is usually successful, considerable damage may have occurred before treatment.

Fully grown second-generation caterpillars migrate out of the webbing to pupate in protected areas, such as under loose bark on tree and shrub trunks and under building siding. Research by Woody Hart (Iowa State University), Fredric Miller (University of Illinois), and Rex Bastian (Henderson the Care of Trees) shows that fully grown larvae will commonly migrate 50 to 80 feet from their host tree, thus, most do not pupate on the host tree.

That research also showed that mimosa webworm pupae can survive winter low temperatures of -11°F to -24°F. Populations in Iowa survive at the colder end of that temperature range, while those in Missouri and Arkansas survive only at the warmer end of that range. Many webworms pupate under siding and around windows of heated buildings where temperatures are a few degrees warmer—which explains why higher populations of mimosa webworms are found in trees near heated buildings and in years following mild temperatures. With last winter's temperatures relatively normal, look for populations to be moderate to high, particularly on urban trees near heated buildings.

Mimosa webworm is controlled with a variety of insecticides, with *Bacillus thuringiensis* var. *kurstaki* (Dipel, Thuricide) the most environmentally friendly. If an insecticide is used, high-pressure application will move more of it through the webbing to the caterpillars. (*Phil Nixon*)

Lilac Borers

Lilac borers are emerging throughout the northern two-thirds of the state, with the Morton Arboretum reporting significant numbers and large numbers also being seen farther south. At this time, applications of chlorpyrifos (Dursban) to the trunks and larger branches of young, recently planted ash trees will reduce attack. Once large numbers of moths emerge, there is at least a two-week delay before egg hatching occurs. One application of Dursban should provide control throughout the egg-hatching period. *(Phil Nixon)*

Caterpillars

Several **caterpillar** species appear at this time of year on a wide variety of woody plants. Those on deciduous plants cause aesthetic damage by leaf removal, but usually no long-term effects. They are all easily controlled with insecticide applications. *Bacillus thuringiensis* var. *kurstaki* (Dipel, Thuricide) and many other chemical insecticides are effective.

Bagworms are hatching in southern Illinois. Delay treatment for a week in southern Illinois to allow remaining eggs to hatch and for larval ballooning to end. We have yet to see hatching farther north in Illinois.

Be on the lookout for **white-marked tussock moth** larvae in northern Illinois on oaks, crabapples, and many other trees. Southern areas of the state should be between generations of this insect.

First-generation **yellow-necked** and **walnut caterpillars** should be present in southern and central Illinois. These caterpillars are reddish when young but

turn black when older. Walnut caterpillars have a few indistinct white stripes and are most common on walnut, hickory, and pecan. Yellow-necked caterpillars have many obvious white stripes and are common on the same trees as walnut caterpillars, as well as on oaks. *(Phil Nixon)*

PLANT DISEASES

More Anthracnose of Trees

This disease of trees has been discussed in Issue Nos. 4 and 6 and still causes concern. Leaf spotting has been common on maple, elm, ash, and oak—although many other species are susceptible. Bud blight, shoot blight, and cankers have been common on sycamore. Anthracnose also causes cankers on oak.

The most common concern is the leaf cupping and distortion that sometimes occurs on oak and ash. Owners usually fear that a chemical drift has been involved. While that may be part of the problem, anthracnose on these two species can, in fact, cause leaves to curl and cup around the necrotic areas. (If chemical drift is the problem, other species of plants in the immediate area should show symptoms.) Cool weather also causes newly emerged leaves to be cupped or slightly twisted.

Anthracnose fungi seem to be present throughout the state. Anthracnose has been a problem this year because the weather conditions have stalled on "cool and wet" for so long. Under these weather conditions, when succulent new growth is present with the pathogen, the disease will occur. We still maintain that chemicals are not helpful at this stage of disease and that improving tree vigor is all that can be done. Annual infection may weaken a tree and contribute to stressed growth, but we have not seen anthracnose kill a tree. *(Nancy Pataky)*

Sphaeropsis Update

Sphaeropsis blight of pine also continues to be a major problem and will continue throughout the season (see Issue No. 1 for a complete description of symptoms). Wisconsin plant pathologist Dr. Glen Stanosz is involved in research on this fungus. He said the current belief is that the tip blight of this fungus and its canker phase are caused by different strains of the same organism, usually referred to as strains A and B. I had believed that the canker phase invaded winter-injured wood, but the idea of different strains provides food for thought. Stanosz's research also explains the presence of the canker phase without the tip blight in many cases.

According to Stanosz, preliminary studies suggest that highly fertilized trees are actually more susceptible to anthracnose. When trying to help a stressed pine, don't push the fertilization levels. Instead, concentrate on providing water to the trees whenever a drought period lasts for two weeks or longer. *(Nancy Pataky)*

Leaf Spots of Turf

The leaf disease known as Helminthosporium leaf spot of turf has been reclassified into several leaf diseases. We now refer to "Helminthosporium types" when discussing leaf spots in the genera *Bipolaris, Drechslera,* and *Exserohilum*.

These fungi are now active and may be found on all turfgrasses in Illinois. The symptoms vary depending on fungal species, grass species, weather conditions, and cultural conditions. In general, look for small spots or lesions varying in color from reddish brown to purplish black. Lesion centers are often tan and typically have a dark reddish brown border, giving an "eyespot" appearance. In wet weather, the lesions may merge, yellowing the turf or causing tip dieback.

These leaf spot diseases favor dry periods alternating with prolonged periods of cloudy, moist weather and moderate temperatures. The diseases progress quickly when grass is cut too short, turf is slow growing, or fertility is low. Excessive shade and excessive use of nitrogen also encourage leaf spot diseases. Other stresses contribute to disease severity.

Cultural control measures are usually effective. In cases for which such measures are not adequate (such as at some golf courses), chemical controls may be used as protectants. Chemicals labeled for use in Illinois are listed in the *1997 Illinois Commercial Landscape and Turf Pest Management Handbook.*

Correct mowing practices will help control leaf spot. Mow all turfgrasses at the recommended maximum height for the species. Mow frequently enough so that no more than one-quarter to one-third of the leaf surface is removed at one time. If a lawn has been fertilized, it may be necessary to mow every three or four days during warm, wet periods.

These leaf spot diseases can be suppressed with proper fertilization; however, it is important to avoid high levels of nitrogen. Turf specialist Tom Voigt has

guidelines on how much fertilizer to apply to a home lawn and when to make the applications.

Information is available on leaf spot disease resistance by some bluegrass cultivars adapted to Illinois. The resistance will vary somewhat by location. Consult *Report on Plant Diseases* No. 405. *(Nancy Pataky)*

"Wet Feet" of Trees, Shrubs, and Flowers

Many areas of the state have experienced an overabundance of rain in the last two months. This sets the stage for root problems known as "wet feet" ("feet" refers to roots). Symptoms are often the same as those resulting from a lack of water and include withering of leaves, little terminal growth, yellowing of foliage, and dieback of shoots and roots. Some woody plant species are particularly sensitive to such conditions—yews, rose, white birch, Norway and sugar maples, flowering dogwood, and forsythia, to name only a few.

Water tolerance of many plants is discussed in *Diseases of Trees and Shrubs* by Sinclair, Lyon, and Johnson. Most tree identification books also list such sensitivities as part of the species description.

It seems ironic that too much water causes plants to die from a lack of water. Excess water causes a lack of soil oxygen, and without oxygen, the roots cannot respire properly and cannot take up water. Roots then suffocate. For long-term control, you must improve drainage, lighten the soil with a mixture of organic matter and sand, and avoid too much additional water.

If you are not certain that excess water is the problem, dig up some of the soil around the suspect plant. In a typical situation with too much water, the soil will be saturated and standing water may be evident. Roots will be black or brown internally, rather than white. In most cases, fungicides do not help—they protect healthy plants from root-rot pathogens, but do not revive dead roots. The water problem must be alleviated for new roots to form.

In some cases, wet soils predispose plants to root rots. For instance, *Pythium* and *Phytophthora* are common mold fungi that invade stressed plants in wet soils. If the water problem has been eliminated and root rot is still present, then a root-rot fungus might be involved as well. This is particularly true if not all plants in a bed are affected. In such a case, consult a lab or specialist trained to identify root-rot fungi. Soil fungicide drenches are available to stop the progress of root rots in herbaceous plants and small shrubs, but there is nothing that can be used on mature trees.

Information on root rots is available in *Report on Plant Diseases* No. 615 (Damping-Off and Root Rot of House Plants and Garden Flowers), No. 602 (Armillaria Root Rot of Trees and Shrubs), and No. 664 (Phytophthora Root Rot and Dieback of Rhododendrons and Azaleas). *(Nancy Pataky)*

Home, Yard and Garden Pest Newsletter *is prepared by Extension specialists from the University of Illinois at Urbana-Champaign and the Illinois Natural History Survey. Information for this newsletter is gathered with the help of staff members, Extension field staff, and others in cooperation with the USDA Animal and Health Inspection Service.*

Major authors are Phil Nixon, (217) 333-6650, John Lloyd, (217) 333-6653, and Fredric Miller, (708) 352-0109, entomologists; Nancy Pataky, plant pathologist, (217) 333-0519; and Rhonda Ferree, Tom Voigt, and David Williams, horticulturists, (217) 333-0350. Phil Nixon is the executive editor of the Home, Yard and Garden Pest Newsletter. *This newsletter is written by faculty in the Department of Natural Resources and Environmental Sciences and the Department of Crop Sciences. The newsletter is edited by Peggy Currid, typeset by Jerry Barrett, and proofread by Herbert Morgan, all of Information Services.*

COOPERATIVE EXTENSION SERVICE

HOME, YARD & GARDEN PEST NEWSLETTER

college of agricultural, consumer and environmental sciences, university of illinois at urbana-champaign ▲ illinois natural history survey, champaign

No. 10 • June 25, 1997

This newsletter is issued weekly (biweekly in the early spring and late summer) to provide timely information on insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

PLANT DISEASES

Fire Blight After All!

In Issue No. 4 of this newsletter, we predicted that fire blight would probably not be a problem in central and northern Illinois. We should know better than to predict based on normal weather conditions. The fire blight bacterium will infect most readily during the flowering period when wetting periods occur with mild temperatures. Fruit pathologist Dr. Steve Ries states that frequent rains in May with moderately cool weather prolonged the bloom period, creating ideal conditions for this disease. Ries now reports that fire blight is being observed throughout Illinois. The central and northern areas seem to be most noticeably affected—the blossom blight phase is occurring in the northern areas of the state, and the more typical shoot blight phase is in the central section. Although Ries is referring specifically to the disease on edible apples, fire blight might also occur on crabapple, ornamental pears, cotoneaster, firethorn, hawthorn, mountainash, quince, serviceberry, and spirea.

Streptomycin sprays are used by commercial fruit growers to prevent fire blight. Although streptomycin sprays are on the market for the homeowner application as well, we do not usually recommend such use. In any case, no amount of streptomycin will slow the disease. Only hot, dry weather will accomplish that feat. It is very tempting to immediately prune away the shoot blight phase. However, the pruning process will stimulate tree vigor, producing numerous new succulent and highly susceptible shoots that will become infected during the next rain. Wait until hot, dry weather stops the disease before pruning out infected wood. *(Nancy Pataky)*

Oak Wilt

Keep an eye out now for this oak disease. It is caused by a fungus (*Ceratocystis fagacearum*) that enters and plugs up the water-conducting vessels of sapwood. Symptoms vary depending on the oak species involved. Generally, oaks in the red and black group develop discolored and wilted leaves at the top of the tree or at the tips of lateral branches in late spring and early summer. The leaves curl slightly and turn a dull pale green, bronze, or tan, starting at the margins. Usually by late summer, an infected tree has dropped all its leaves. We have seen red oaks move through the phases of initial symptoms to total defoliation in as little as three weeks.

The white and bur oak group generally shows symptoms on branches scattered throughout the crown. Leaves become light brown or straw-colored from the leaf tip toward the base. The leaves curl and remain attached to the branches. The tree may die in one season but is much more likely to survive for many years with a stagheaded appearance. Recent appearances of anthracnose on white oak have caused concern among many tree specialists who fear oak wilt. Anthracnose causes brown spotting on leaves and may cause slight leaf cupping as well.

Other problems can mimic oak wilt, including construction damage, soil compaction, changes in the soil grade or water table, lightning damage, nutritional disorders, insect and animal injuries, chemical damage, cankers, and root decay. None, however, have the distinct vascular discoloration found with oak wilt. To detect the discoloration, peel the bark back with a knife. The sapwood of a healthy tree is white or tan. A

ACES College of Agricultural, Consumer and Environmental Sciences, University of Illinois at Urbana-Champaign

Helping You Put Knowledge to Work—State • County • Local Groups
U.S. Department of Agriculture Cooperating
The Cooperative Extension Service provides equal opportunities in programs and employment.

tree suspected to be infected by oak wilt will show brown and white streaking of the wood. A sample without the characteristic streaking does not rule out the oak wilt fungus, which could be present elsewhere in the tree. Therefore, proper sampling is important. A slight brown streak is normal on healthy wood as air comes into contact with the sapwood. The distinct discoloration from oak wilt is evident as soon as the bark is peeled back and does not intensify as the wood dries.

The Plant Clinic can prepare cultures from wood and detect the presence of oak wilt fungus. Branch samples should be six to eight inches long, about as thick as a thumb, alive but showing symptoms, and must contain vascular discoloration. It takes about seven days for the fungus to develop in the lab to the point that a confirmation can be made.

Oak wilt fungus infects through fresh wounds and can spread by root grafts between trees. The disease is particularly threatening because there is no complete control or cure after infection. Although it is not possible to save an infected tree, surrounding trees may be saved, so a correct diagnosis is important. For more information, refer to *Report on Plant Diseases* No. 618.

This serious disease has been found in all parts of Illinois over the last decade. However, oak wilt does not appear to be spreading any more quickly than it has in the past, and we do not expect to see an epidemic. *(Nancy Pataky)*

Slime Molds

These growths suddenly appear after heavy rains or after watering plants in warm, muggy weather. Slime molds are primitive organisms that flow (very slowly) over low-lying objects such as mulches, sidewalks, and driveways, and over vegetation such as turfgrasses, strawberries, bedded flowers, ground covers, weeds, and woody plants.

Slime mold organisms do not take nutrients from the plant material (or from the sidewalk!). They feed on decaying organic matter, fungi, and bacteria in the soil and the turfgrass thatch layer. During warm, moist weather, the slimy, amoebalike stage flows over low-lying objects and appears as watery-white, gray, cream-to-light-yellow, violet, blue, green, or purple-brown greasy masses one to two feet in diameter. This stage soon develops into colorful crusty fruiting bodies filled with masses of dusty spores.

Chemicals do not provide control against slime molds. Instead, for abundant molds, break up the unsightly spore masses by vigorous raking, brushing, or hosing down with a stream of water. Mowing the lawn usually removes spore masses. Slime molds disappear with hot, dry weather. For more information about slime molds, read *Report on Plant Diseases* No. 401, which discusses slime molds in turf. *(Nancy Pataky)*

Phomopsis Galls

We recently received a very interesting case of galls on forsythia. The gall was caused by the fungus *Phomopsis*, but looked very much like a systemic infection of crown gall or possibly a stem gall from an insect. The galls were about 1 to 1-1/2 inches wide, had a bumpy, roughened texture, and looked like a cluster of nodules pressed tightly together. They had little points over their surface—similar to oak sower galls. When we broke off the points of these forsythia galls, however, we did not find insect chambers. Instead, we saw a mass of undifferentiated plant tissue and fruiting bodies (pycnidia) of *Phomopsis*.

Phomopsis galls can occur on many tree species, including highbush blueberry, American elm, hickories, maples, oaks, and privet. On an oak in central Illinois, we saw two masses of galls that were approximately two feet wide. The galls that we found on forsythia were only about 1/2 inch wide. If these galls girdle the twig, dieback will result. Otherwise, very little is known about the disease cycle. *(Nancy Pataky)*

INSECTS

Armyworms

Armyworms have been causing damage to turfgrasses southwest of Joliet. These caterpillars, when present in large numbers, can defoliate large areas of turf. Those in the Joliet area were small enough in number that the damage was relatively localized.

Armyworm caterpillars feed primarily on small grains such as wheat and rye. At this time of year, they are likely to leave these field crops and attack nearby turfgrass areas. They feed at night, moving across the turf in large numbers like an army—hence, their name. When present in large numbers, armyworms can eat all of the grass blades off half (or more) of a lawn in one evening, leaving only the brown thatch behind. Armyworms hide in the thatch the next day, emerging again at night to finish off the other half of the lawn and possibly part of an adjacent

one. Healthy turf will recover by growing new leaves off of rhizomes, but the lawn will not regain its former appearance for at least a few weeks. Smaller numbers of armyworms may cause thin areas; light damage may go unnoticed by many homeowners.

Armyworm caterpillars are 1 to 1-1/2 inches long and are brownish to black with two orange stripes on each side and a pale orange stripe down the back. When young and small, they are blackish with thin stripes. Armyworm larvae are commonly attacked by tachinid flies, which lay eggs on the back of the caterpillars, usually just behind the head. The hatching fly larvae tunnel into caterpillar hosts, devour their insides, and emerge as fully grown maggots. The maggots then pupate and emerge as a fly that resembles a large housefly.

Caterpillars that are not parasitized pupate in the soil to emerge as orangish tan to grayish brown moths with a tiny white dot in the center of each forewing. These moths, commonly referred to as "millers," have a 1-1/2-inch wingspan and are strongly attracted to lights at night. After mating, the female moth lays eggs in rows or clusters on grass blades, rolling the leaf blade around the eggs. There are usually three generations per year.

Armyworms can be controlled with a variety of insecticides, including bifenthrin (Talstar), carbaryl (Sevin), chlorpyrifos (Dursban), diazinon, trichlorfon (Dylox, Proxol), and the nematode *Steinernema carpocapsae* (Biosafe-N, Biovector). The key to successful control is recognizing the problem and treating it before the lawn is devoured. Fortunately, even high numbers of caterpillars may not cause major turf damage if the parasitism rate is high. *(Phil Nixon)*

Cicadas

Periodical cicadas are present in large numbers in the Macomb and Galesburg areas. Protect young tree trunks with tree wrap or netting to avoid serious injury caused by egg laying. The protection can be removed in mid-July. A year or two before a major emergence in a particular area, a few cicadas will appear. This explanation seems to be the case in the southern two-thirds of Illinois, where very small numbers of cicadas have been seen recently. These numbers are too small to cause important damage, so no protective measures need be taken, but the singing by male cicadas is noticeable. *(Phil Nixon)*

Borers

Lilac borer moths are being attracted to pheromone traps in significant numbers at the Morton Arboretum. These moths resemble paper wasps. Their front wings are brownish black, and the smaller rear wings are clear. Sometimes they have one or more yellow stripes around their bodies. Lilac borer moths lay eggs in the bark of trees and shrubs in the Oleaceae family—especially lilac, ash, and privet. After hatching, the larvae—which are creamy white with a brown head—burrow under the bark and feed on phloem tissue.

When scouting, look for dead canes and cracked bark. The entrance holes are irregularly shaped and contain frass. Exit holes are smaller, about 1/4 inch in diameter and circular. Exit holes do not show signs of frass. Branches can be severely damaged by this borer.

Peach tree borer moths are just starting to emerge at the Morton Arboretum. These moths are dark blue with orange bands around the abdomen. Primarily, they attack plants in the *Prunus* genus (flowering cherry, purpleleaf plum, cherries, apricots, peaches, and nectarines). When fully grown, the larvae are about 1-1/4 inches long, are white with brown heads, and have five pairs of prolegs (back legs). They feed in burrows at the base of trees.

Borer activity frequently girdles small trees, so they can be a serious problem in nurseries. They may weaken older trees, making them more susceptible to bark beetles. When monitoring, look at the root crown for cracked bark, frass, and gummosis.

Chlorpyrifos (Dursban) is the standard treatment for both lilac and peach tree borers on ornamental trees. On fruit trees, growers should consult fruit-tree management recommendations. In the northern half of Illinois, lilac and ash borers should be treated now with sprays on tree trunks and major branches. In northern Illinois, treatment next week will not be too late. Peach tree borers should be treated in southern Illinois by spraying the base of the trunk. Treatment should occur a week later in central Illinois and two to

three weeks later in northern Illinois. *(Karel Jacobs, the Morton Arboretum; Fredric Miller and Phil Nixon)*

Caterpillars

First-generation **fall webworm** is hatching in southern and south-central Illinois. Fall webworm has two generations throughout the southern half of Illinois, but can have three generations in the far southern reaches of the state. Fortunately in most of Illinois, the major damage occurs from the second generation. If, however, you are one of the unfortunate few with early summer problems with this pest, take heart and trim the tents out when they are small and easily accessible. Otherwise, a treatment with *Bacillus thuringiensis* var. *kurstaki* (Dipel, Thuricide, etc.) that penetrates the tent should provide adequate control to prevent major defoliation.

First-generation **yellownecked caterpillar, walnut caterpillar,** and **mimosa webworm** are also hatching throughout the southern and south central regions of the state. *(John Lloyd)*

Leafminers

Locust leafminer damage is becoming obvious on black locust trees in southern Illinois. By this time of the season, the mines are turning brown and the damage is done. Throughout most of Illinois, there is only one generation of locust leafminer per year, but the extreme southern part of Illinois can have two generations. **Elm leafminer** and **holly leafminer** also have one generation per year. For these leafminers with one generation, if the mines are brown, control must be postponed until the following year.

Birch leafminer larvae are coming out of leaves and dropping to the ground to pupate at the Morton Arboretum in northeastern Illinois. Like other leafminers, the larvae eat tissues between the upper and lower leaf surfaces, creating brownish, blotchy mines. One half or more of each leaf can turn brown. The larvae are approximately 1/4 inch long and light brown. Birch leafminer has three or four generations per year.

Leafminers on oak, birch, and alder have several generations per year. If the mines on birch and alder are brown, begin scouting for new mines on new leaves as the season progresses. Treatments with systemic insecticides should help reduce damage by new leafminers. If leafminer control is desired to retain the appearance of affected trees, examine plants with perennial leafminer problems earlier in the spring for the first signs of leafminer injury. *(Karel Jacobs, the Morton Arboretum; Fredric Miller and John Lloyd)*

Home, Yard and Garden Pest Newsletter *is prepared by Extension specialists from the University of Illinois at Urbana-Champaign and the Illinois Natural History Survey. Information for this newsletter is gathered with the help of staff members, Extension field staff, and others in cooperation with the USDA Animal and Health Inspection Service.*

Major authors are Phil Nixon, (217) 333-6650, John Lloyd, (217) 333-6653, and Fredric Miller, (708) 352-0109, entomologists; Nancy Pataky, plant pathologist, (217) 333-0519; and Rhonda Ferree, Tom Voigt, and David Williams, horticulturists, (217) 333-0350. Phil Nixon is the executive editor of the Home, Yard and Garden Pest Newsletter.
This newsletter is written by faculty in the Department of Natural Resources and Environmental Sciences and the Department of Crop Sciences. The newsletter is edited by Peggy Currid and Herbert Morgan, typeset by Oneda VanDyke, and proofread by Herbert Morgan, all of Information Services.

COOPERATIVE EXTENSION SERVICE

HOME, YARD & GARDEN PEST NEWSLETTER

college of agricultural, consumer and environmental sciences, university of illinois at urbana-champaign ▲ illinois natural history survey, champaign

No. 11 • July 2, 1997

This newsletter is issued weekly (biweekly in the early spring and late summer) to provide timely information on insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

INSECTS

Birch Sawfly on Willow

Birch sawfly larvae feeding on willows have been reported from the Rockford area and the Morton Arboretum. This insect feeds on the leaves of gray, paper, and other birches, as well as willow and alder.

Adult birch sawflies are present during June and July, laying their eggs in slits they make in the leaf margins. Larvae are present from June to September. Fully grown larvae are yellowish, with 12 rows of black spots. They are about one inch long and have reddish yellow heads. Larvae spend the winter as prepupae in silk cocoons spun in the leaf litter. There is one generation per year.

The larvae can be controlled with carbaryl (Sevin), diazinon, chlorpyrifos (Dursban), acephate (Orthene), and a variety of other insecticides. Realize that this insect is not a true caterpillar and is not controlled by *Bacillus thuringiensis* var. *kurstaki* (Dipel, Thuricide). Because birch sawfly attacks fast-growing trees, one or two years of heavy defoliation is unlikely to cause much harm to the host tree. *(Barb Larson, Winnebago Extension Unit; Karel Jacobs, the Morton Arboretum; Fredric Miller and Phil Nixon)*

Bagworms

Bagworms have hatched in southern and central Illinois, with reports from Morrisonville, Peoria, and Champaign. Bagworms hatch over a period of about two weeks. Newly hatched bagworms climb to the top of the tree or shrub and hang on a strand of silk. These strands break in the wind, and the bagworm blows through the air. This ballooning is the main way that bagworms find new hosts because the adult female moth is wingless. She stays in her bag on the host tree while filling her body with overwintering eggs.

This larval ballooning activity may cause sprayed trees and shrubs to be reinfested from other areas. The combination of the ballooning plus the extended egg-hatching period is the basis of the suggestion that one should wait for about two weeks after first hatch before treating for bagworms. Otherwise, more than one insecticide application will probably be needed. Young bagworms feed on the leaf epidermis and underlying mesophyll, causing whitish areas on the leaves that later dry and turn brown. Older bagworms eat through the leaves, causing skeletonization and defoliation.

Many insecticides are effective against young, small bagworms. It is time to control bagworms in southern Illinois, with control recommended in about a week in central Illinois and in about two weeks in northern Illinois. Once the bagworms get at least 1/2 inch long, many insecticides provide little control. Our research has shown that *Bacillus thuringiensis* var. *kurstaki* (Dipel, Thuricide), trichlorfon (Dylox), and cyfluthrin (Tempo) are effective against older as well as younger bagworms. *(Phil Nixon)*

Potato Leafhopper

Potato leafhopper nymphs are feeding on American elm, red maple, and Japanese pagoda tree. These nymphs are 1/8 inch long or less, are green with white eyes, and have wing buds. They also attack oaks, other maples, red mulberry, cottonwood, birch, apples, dogwood, hawthorn, euonymous, and cherries. Leafhoppers feed on sap from the leaf's vascular system. Frequently, severe stunting is seen, along with extensive foliage damage. Damage can compromise a tree's ability to cope with winter weather. *(Karel Jacobs, the Morton Arboretum; Fredric Miller, John Lloyd, and Phil Nixon)*

ACES College of Agricultural, Consumer and Environmental Sciences, University of Illinois at Urbana-Champaign

Helping You Put Knowledge to Work—State • County • Local Groups
U.S. Department of Agriculture Cooperating
The Cooperative Extension Service provides equal opportunities in programs and employment.

Scouting

It is amazing what a few weeks of average to above-average temperatures bring about in the insect world. Over the last several weeks, insect development has caught up to what is normal for all areas of Illinois. The cool spring of 1997 that delayed insect activity is just another example why it is important to scout. For ease of use, most insect events are correlated with the calendar; however, insects can't tell time or read. Insects and plants are cold-blooded and therefore rely on warm temperatures to develop. In the *1997 Illinois Commercial Landscape and Turf Pest Management Handbook*, we have added phenological plant indicators from *Coincide*, by Don Orton, to assist practitioners in identifying when pests may be active in relation to plant development. Although active scouting is necessary to identify if insect problems exist, these predictive tools can help focus scouting efforts. *(John Lloyd)*

Aphids

Aphids, or plant lice, feed on almost every living plant. They feed on plant juices or sap. In most cases, small populations do not cause much damage on woody ornamentals.

Aphid populations can build up rapidly by means of a reproductive process known as parthenogenesis. Female aphids can reproduce without males. No mating is necessary; each female aphid is essentially born pregnant. By virtue of this unusual reproduction, one aphid can create an infestation with her offspring in a short time. Each female aphid lives, on average, about a month and produces from 80 to 100 offspring. It usually takes less than a week for aphids to reach adulthood from birth. Depending on the species and area of the country in question, aphids can have from 10 to 50 generations per year. Extrapolate from here, and you get a whole lot of aphids, all without the help of males.

Some species of aphids produce males in response to changes in day length and plant-sap content, particularly toward the end of the growing season. These same conditions also can initiate the production of females incapable of parthenogenesis. The males that are produced mate with the females, who produce eggs that overwinter. The overwintering eggs hatch the following spring and produce females that reproduce parthenogenetically.

Most parthenogenetic females are wingless and thus never move from the plant on which they are born. If a young female aphid is touched repeatedly while growing up, she remains wingless but bears young that grow wings as they mature. In this way, aphids can escape crowded host plants to attack other suitable hosts.

With their high reproductive potential and their ability to disperse when conditions warrant, it's amazing that any plants survive onslaughts by aphids, right? Wrong. Aphids, like many other insects, use reproduction as a defense strategy. Rather than fight or flee, they reproduce. It's like the story of the two rabbits running away from a fox. As the fox catches up to the rabbits, one rabbit turns to the other and says, "Let's turn around and outnumber him." The other rabbit replies, "We can't, stupid—I'm your brother." As a result of their ability to create large populations rapidly, aphids are a favored host for many predators and parasites (also called natural enemies). When aphids are found, there are usually predators grazing on them. Ladybeetles are one of the more commonly recognized predators of aphids, but other common natural enemies include lacewing larvae, flower and other fly larvae, and parasitic wasps. The presence of these and other unusual-looking insects in the midst of aphid populations is a good indication that the aphids will probably be reduced to very small numbers within one to two weeks, so that insecticide applications will probably not be needed.

Although there are aphids that can attack many species of plants, most aphids are able to feed only on a few closely related host plants. For this reason, high numbers of aphids on weeds or other plants in the vicinity are not usually a threat to cultivated plants and do not need to be controlled. Indeed, their presence may attract and build up numbers of predators and parasites that will be available to attack new aphid populations that may occur on cultivated plants in the vicinity. Unlike aphids, most of these natural enemies are not very host-specific.

Most complaints about aphids in trees are based on the honeydew, or leftover sap, that they excrete. It is sticky and can be difficult to remove from vehicles that are parked underneath trees with high aphid populations. Honeydew is a good source of sugar for ants. In some cases, ants herd and protect aphids from predators and, in turn, feed on the honeydew they produce. Sooty mold fungus can grow on honeydew and may create a problem on plants located underneath other plants with high aphid populations.

At this time of the year, aphids can become numerous on crabapples, yellow poplar, spirea, and other plants throughout Illinois. Interestingly, most aphid problems we are discovering are from areas that haven't had rainfall during the last couple of weeks. Aphids knocked off plants by rain usually don't make it back to the plant. Also, high moisture is conducive to development of fungal pathogens that kill aphids. In fact, one form of control for aphids is to flush them from the plant with heavy streams of water. This method of control, as well as the use of insecticidal soaps, usually allows predators, parasites, and pathogens to become better established within the aphid population and continue their "natural" control of the pests. When other "nonspecific" insecticidal compounds with longer residuals are used for control, the risk of killing off the natural enemy complex feeding on the aphids and other pest insects can offset the gain made by the insecticide application. Aphid populations will grow again but will not be held in check by their natural enemies.

Aphids can be managed with a variety of compounds that either act on contact or act systemically through the plant. Contact insecticides, such as insecticidal soap and horticultural oils, work well when they come in direct contact with the aphids. In situations in which the aphids are hidden, a systemic compound such as acephate (Orthene) is more effective. All valid methods of aphid management are listed in the *1997 Illinois Commercial Landscape and Turf Pest Management Handbook. (John Lloyd and Phil Nixon)*

PLANT DISEASE

Dutch Elm Disease

It is time to be looking for symptoms of this elm killer. Many people have the mistaken impression that this disease is a thing of the past because there are now so few elms around. Not so! We receive many elms at the Plant Clinic each year with requests for testing for the Dutch elm disease fungus. Unfortunately, we are still able to make many positive isolations.

Dutch elm disease (DED) is caused by a fungal pathogen, *Ceratocystis ulmi*. The disease works much like the other vascular diseases, causing plugging of the vascular tissues and resultant wilting and death of foliage. American elms are very susceptible to this pathogen. Although Chinese elm and Siberian elm are known to be more resistant, infection of these species can occur as well. Work is still underway to develop resistant elms, including the more resistant Sapporo Autumn Gold, American Liberty, and Urban elms.

Watch for yellowing of leaves in the elm, followed by wilting and browning. A single branch usually shows symptoms first, with rather rapid spread to adjacent branches and the entire tree. Look for vascular discoloration to help with diagnosis of this disease. As with oak wilt and verticillium wilt (discussed in earlier issues), DED causes a streaking of the sapwood. Peel back the bark of a symptomatic branch to reveal the brown streaks in the otherwise tan outer sapwood. We generally select branches of about thumb thickness, with wilted leaves. Verticillium wilt and Dothiorella wilt can also cause this streaking in elm.

Positive identification requires laboratory culturing of the fungus. Cut several six- to eight-inch long sections from wilting, but living, branches that show definite streaking in the sapwood. The fresh wood sections should be a half to one inch in diameter and sent in plastic or foil to the Plant Clinic for testing. Expect about seven days of lab time for the fungus to grow to the point at which it can be positively identified. There is a $10 fee for this service.

For more information on DED, including control procedures, consult *Report on Plant Diseases* No. 647. A similar disease caused by a phytoplasma is discussed in *Report on Plant Diseases* No. 660, Elm Yellows or Phloem Necrosis and Its Control. *(Nancy Pataky)*

Powdery Mildew

The powdery mildew diseases affect woody and herbaceous ornamentals, as well as vegetable, cereal, and fruit crops. These fungal diseases are easy to identify due to the characteristic white to light grayish powdery growth, primarily on leaves. In fact, I have told gardeners that this is one disease that they must know in order to become a master gardener.

After the initial "easy to identify" stages of this disease, other lesser-known symptoms may occur. Look for stunting, curling of the leaves, chlorosis, premature leaf drop, and deformation of the flower buds. Apples and crabapples are commonly infected, but scab or some other accompanying disease often gets blamed for the stunting, chlorosis, and curling of leaves. Even the easy-to-diagnose white powdery growth can be masked on plant species with heavy pubescence.

The fungi that cause powdery mildews flourish on warm to hot days followed by cool nights, and when dews form on the leaves. Disease is most severe on crowded plants, in shaded locations, or where air circulation is poor. Unlike most fungal diseases, powdery mildew is not as destructive when rains are frequent. High relative humidity (but not rain) is needed for spores to germinate, and mildew develops rapidly in extended periods of warm, dry weather when morning dews are heavy. Ideal disease conditions are 90 to 99 percent relative humidity at 66°F to 72°F temperatures.

Look for cultivars resistant to mildew whenever possible. Pruning out diseased wood (especially on rose and crabapple) during the normal pruning period greatly reduces overwintering inoculum. Try pruning plants to allow better air circulation within the plant as well as within the planting. Never handle the infected plants when they are wet. As usual, plants should be maintained in high vigor to withstand disease attack.

Fungicides are available to control the mildews. In fact, this is one of the few diseases that can be treated after symptoms are observed. If sprays are begun at the first sign of mildew, control can be attained. Often, however, damage is only aesthetic, and the actual vitality of the plant is not affected. If a fungicide is chosen, use one of the products recommended under the appropriate host in the *1997 Illinois Commercial Landscape and Turf Pest Management Handbook*. Further information on the powdery mildews is available in *Report on Plant Diseases* Nos. 611 and 617. *(Nancy Pataky)*

Frogeye Leafspot

Frogeye leafspot is a fungal disease that has been prevalent in the Midwest the last several years on apple and crabapple. It is the leafspot phase of the disease known as black rot. Classic symptoms include numerous small spots on older cluster leaves, with marked zones of lighter and darker tissues within the spots. The margins of the lesions remain purple, while the centers become tan, giving the spots the typical frogeye appearance. Leafspot causes early defoliation, much like apple scab. In many cases, this disease is overlooked or blamed on scab. Affected leaves are always near dead or dying limbs on which a black rot canker is present. This same canker (and, in some cases, infected leaves) produces inoculum, which then infects developing fruit in August and September. For this reason, removal and destruction of all dead wood during annual pruning is the recommended control measure.

Secondary inoculum of a disease refers to spores or bacteria that spread from the initial infection to another site on the host. Most fruit diseases with a secondary inoculum as part of their life cycle have been in the secondary inoculum phase for weeks. Scab, fire blight, powdery mildew on apple, brown rot and scab of peach, cherry leafspot, and other diseases require only rain to explode in numbers. Expect to see these diseases on susceptible varieties. Most damage to the tree occurs when the inoculum is present, leaf tissues are young, and rain is present. As plant tissue becomes older, less damage occurs.

Black rot and frogeye leafspot of apple is discussed in *Report on Plant Diseases* No. 814. *(Nancy Pataky)*

Home, Yard and Garden Pest Newsletter *is prepared by Extension specialists from the University of Illinois at Urbana-Champaign and the Illinois Natural History Survey. Information for this newsletter is gathered with the help of staff members, Extension field staff, and others in cooperation with the USDA Animal and Health Inspection Service.*

Major authors are Phil Nixon, (217) 333-6650, John Lloyd, (217) 333-6653, and Fredric Miller, (708) 352-0109, entomologists; Nancy Pataky, plant pathologist, (217) 333-0519; and Rhonda Ferree, Tom Voigt, and David Williams, horticulturists, (217) 333-0350. Phil Nixon is the executive editor of the Home, Yard and Garden Pest Newsletter. *This newsletter is written by faculty in the Department of Natural Resources and Environmental Sciences and the Department of Crop Sciences. The newsletter is edited by Mary Overmier and Peggy Currid, typeset by Jerry Barrett, and proofread by Herbert Morgan, all of Information Services.*

COOPERATIVE EXTENSION SERVICE

HOME, YARD & GARDEN PEST NEWSLETTER

college of agricultural, consumer and environmental sciences, university of illinois at urbana-champaign ▲ illinois natural history survey, champaign

No. 12 • July 9, 1997

This newsletter is issued weekly (biweekly in the early spring and late summer) to provide timely information on insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

PLANT DISEASES

Rose Rosette

Rose rosette symptoms are quite distinctive. The new growth is deep red on leaves and stems. Leaves may show crinkling and distortion, or a mosaic of green, yellow, and red. An infected plant produces numerous lateral shoots that grow in different directions, giving the plant a witches'-broom appearance. These shoots are typically deep red and much larger in diameter than the canes from which they grow. Thorns on these stems are more abundant than normal. Plants usually die within about 22 months of infection.

The vector of this disease is an eriophyid mite, which is so small that 20 of them could fit on a pinhead. The disease can also be spread by grafting.

Rose rosette is believed to be caused by a double-stranded RNA, which means that it is a viruslike disease. It cannot be cultured in a lab, and confirmation of the disease by the Plant Clinic is based purely on symptomology. However, rosette can be diagnosed without the help of a lab.

Multiflora rose is the most common host of this disease, but it has been reported on cultivated flowering varieties as well. Climbers, hybrid teas, floribundas, miniatures, and a number of "old-fashioned" roses have been infected. Hybrid teas typically show a color that is more yellow than red. So far, no other host besides rose has been found.

Currently, infected plants cannot be saved. Plants with symptoms should be dug up and destroyed (including roots) when first noticed. It is strongly suggested that multiflora and garden roses be separated as far as possible from each other. The efficacy of mite control has been questioned in control of this disease. If miticides are used, research suggests that the critical mite transmission time is May and June, so concentrate your efforts in these months. For details of this disease, consult *Report on Plant Diseases* No. 666. *(Nancy Pataky)*

Crown Gall

Crown gall is a bacterial disease known to infect hundreds of plant species. Common hosts in Illinois include euonymus (ground cover), grape, raspberry, and rose. Consult *Report on Plant Diseases* No. 1006 for a detailed list of hosts.

The crown gall bacterium, *Agrobacterium tumefaciens*, enters the plant through a wound. The plant then forms a gall in response to this infection. Galls appear on the trunk, crown, roots, and sometimes on the stems of the host plant. Young galls are white or tan, usually round, and are quite soft and spongy. As the gall ages, it develops an irregular, convoluted, rough, corky surface and a dark brown, hard wood interior. These galls might be mistaken for insect galls or other galls (such as Phomopsis galls, described in Issue No. 10 of this newsletter). Cut the gall open. Crown gall appears as a mass of undifferentiated plant tissue. Insect galls have galleries or pockets with or without insects present. Fungal galls have small fruiting bodies containing spores.

Agrobacterium can survive for more than five years in the soil on organic debris. It is easily spread in soil water or rain splash but can penetrate plants only through fresh wounds. Such wounds might be made during pruning, cultivating, transplanting, budding or

grafting, or feeding by insects or other pests. Euonymus beds have been infected after animals have run through the bed and wounded plants.

Control of crown gall is difficult. Begin by digging up and destroying all severely infected plants. In some cases, crown gall might be present but still have little effect on plant appearance. Such plants can remain at the site until growth declines. Eventually, when replacement plants are needed, consult *RPD* No. 1006 or check the literature for plants that are resistant to this disease. Before purchasing new plants, inspect them closely for galls. Also, be aware that the bacterium will infect susceptible plants put back into the same area where crown gall was first discovered. *(Nancy Pataky)*

White Pine Problems

Although the Plant Clinic has not received as many white pine samples in 1997 as last year, continuing complaints of problems with white pine prompts this article. White pine problems seem to be present throughout the state. Symptoms vary but generally include some pattern of needle yellowing or browning, shriveled bark on branches or trunk, sap exudate on branches, and in some cases, death of the tree. Affected trees have ranged in size from 2 feet to more than 20 feet.

The Plant Clinic has assayed samples for the presence of pinewood nematodes; has cultured for fungal pathogens of needles, stems, and roots; and inspected for insect infestations or injuries. The only common factor seems to be root decline. Few live white roots have been found, but fungal pathogens cannot be correlated with poor rooting. It appears that roots are on the decline for other reasons. Some possibilities include heat, drought, flooding, and sudden extremes in temperature and moisture.

In 1995, we addressed this problem and explained that white pines are understory trees that thrive in the cool, moist, well-drained soils of Wisconsin, although they grow with intermittent success in Illinois. Many of the problem trees we have seen have been situated on clay sites or exposed to the elements (planted in new housing developments or used as windbreaks). It is also likely that site stress has contributed to the decline of these trees. The excessive rains of the past two springs also may have contributed to root injury and decline by saturating the soil and causing a lack of soil oxygen.

Look for more white pine problems this year. If roots were injured as we are suggesting, they will not be able to pull up enough water to replace the loss created by the extremely hot weather of the past two weeks. Watering helps, as does the use of a natural mulch over the root system, but without adequate root mass, plants will not be able to use the available water quickly enough to replace what is used by the foliage. The result will be sudden browning or off-color needles and death of branches.

Because these problems in white pine are not usually the result of an infectious disease, immediate removal of the tree is not necessary. Instead, try to keep the tree watered and see how it responds. Also, try digging into a bit of the root system for a better picture of the situation. If roots are brown in cross-section and the outer layer easily pulls off or is not present, then root injury has occurred. If the roots are white and healthy, then the problem is above ground and our theory is wrong, at least in your case. *(Nancy Pataky)*

Leaf Scorch of Trees

There are two types of leaf scorch on trees: the environmental leaf scorch with which most arborists are familiar, and the pathogenic bacterial leaf scorch which is less well known.

Noninfectious leaf scorch occurs each year whenever water cannot be translocated to the foliage as rapidly as it is lost. The causes vary and include root injury, root rot, poor soil conditions, high winds, transplant shock, flooding, and drought. A complete listing of possibilities is discussed in *Report on Plant Diseases* No. 520. Noninfectious scorch appears as a browning of leaf margins as well as between the veins. Symptoms appear first on newest, succulent leaves and progress toward the trunk. Severely affected leaves often drop from the tree. Generally, the symptoms show on the more exposed parts of the tree initially but may occur uniformly over the entire tree.

The infectious leaf scorch (called bacterial leaf scorch) is caused by the bacterium *Xylella fastidiosa*. It has been reported in Illinois near St. Louis. Although it is predominantly a disease found in eastern and southern states, it is frequently found in western Kentucky and could be present in more areas of Illinois than we are aware of.

Bacterial scorch occurs on elm, oak, sycamore, mulberry, and red maple. Look for scorch symptoms that occur in early summer to midsummer and then intensify in late summer. The symptoms occur first on one branch or section of branches; each year the

number of branches affected may increase. Unlike noninfectious scorch, bacterial leaf scorch develops first on the oldest leaves and progresses toward the tip. Also, infected leaves often remain attached until autumn.

If you have a sample with a history of progressive scorching and leaf retention, you may want to seek lab help for bacterial scorch testing. The Plant Clinic cannot perform the required enzyme-linked assay, but staff can help with sample preparation and can forward materials to the appropriate lab. The fee is $15.00 for such samples. *(Nancy Pataky)*

INSECTS

Annual White Grub Adults

Check for the presence of annual white grub adults. These 1/2-inch-long, tan June beetles emerge in southern Illinois at the end of June. They emerge in central Illinois just before July 4 and in northern Illinois shortly thereafter. The cool weather we had this spring may delay their emergence, but the hot temperatures in the second half of June may have made up for lost time.

These insects hide in thatch during the day, emerging at about 9 p.m. to mate and lay eggs. An ideal time to observe peak flight is around 10:30 p.m. Flight occurs into the early morning hours. The beetles fly low over the turf and and are illuminated by car headlights. They are also strongly attracted to bright outdoor lighting and can be seen flying around streetlights. Because these beetles do not feed, they usually die about two weeks after emergence.

Mated females burrow into the soil to lay eggs, choosing damp, soft soil over dry, hard soil. The recent dry, hot weather means that much of the soil is now dry and hard, which prompts the females to select irrigated turf in which to lay their eggs.

The presence at this time of large numbers of adult beetles in areas where unirrigated turf is dry and brownish should trigger the application of imidicloprid (Merit, Grubex) or halofenozide (Mach 2) over the next three to four weeks. If managed turf is not (or only slightly) irrigated, it is probably best to wait until early August to check for grubs and then use a quicker-acting insecticide such as diazinon, trichlorfon, or bendiocarb. Areas that have received sufficient rainfall for nonirrigated turf to remain green probably do not need an insecticide application, but those areas should be checked in early August to be sure. *(Phil Nixon)*

Japanese Beetles

Japanese beetles should be emerging throughout the state. These stocky beetles are metallic green with coppery wing covers and are 1/2 inch long. They feed on the leaves of a wide range of plants, but prefer crabapple, linden, birch, grape, and rose. Japanese beetles are present through mid-August. Their feeding can be reduced with weekly applications of carbaryl (Sevin) or biweekly applications of synthetic pyrethroids such as bifenthrin (Talstar), cyfluthrin (Tempo), lambda-cyhalothrin (Scimitar), or permethrin (Astro).

Select for treatment those plants that are most important aesthetically in the landscape. Untreated plants may lose much of their foliage, but their health will not be seriously threatened—provided they were healthy to start with.

These insects will also be attracted to irrigated turf to lay their eggs. The resulting white grub larvae feed on the turf and cause damage. Control measures for annual white grubs also apply for Japanese beetle grubs (see previous article). Because Japanese beetle grub populations are usually mixed with those of annual white grub in Illinois, *Bacillus popillae*, which does not control annual white grub, is not recommended. *(Phil Nixon)*

Black Vine Weevil

Black vine weevil damage is being found on new growth of rhododendron. These beetles also feed on azalea, yew, strawberry, euonymus, clematis, and many other plants. These adult beetles, which are nocturnal, chew notches on leaf margins. They are hard-shelled, about 3/8 inch long, and grayish with yellowish markings. The head is drawn out into a broad muzzle. Feeding damage occurs at night; the adults hide in debris beneath plants during the day.

Most of the damage is done by the larvae, which feed on the roots but are difficult to control, except in containerized nursery stock. All of these weevils are females and must feed for two to three weeks before laying eggs. Spraying the foliage heavily with acephate (Orthene), bendiocarb (Turcam), or cyfluthrin (Tempo) will control the feeding adults and prevent subsequent egg laying. *(Karel Jacobs, the Morton Arboretum; Fredric Miller and Phil Nixon)*

Sawflies and Casebearer

Casebearer and sawfly have been found on larch. These sawfly larvae are pale gray-green on top and even lighter underneath. They have black heads and

legs. Sawfly larvae feed on leaves of larch, usually starting near the bottom of the tree. Casebearers mine larch leaves, emerging in September. They are named for the case they build for themselves, which is really a mined-out larch leaf lined with silk. The case is brown and cigar-shaped. (Thanks to Mike Fee for pointing out these and many other insects this week.)

Sawfly larvae are also present on black locust. These larvae are light green with pale pinkish green heads. When young, they create holes in the leaflet's interior. When more mature, they chew on the edges of the leaflets. Birch sawfly continues to be present on willow. It can also feed on birch and alder.

These sawflies and the casebearer can be controlled with sprays of carbaryl (Sevin), diazinon, and many other insecticides. Casebearer can also be controlled with *Bacillus thuringiensis* var. *kurstaki* (Dipel, Thuricide). *(Karel Jacobs, the Morton Arboretum; Fredric Miller and Phil Nixon)*

Woolly Aphids

Woolly aphids, which sometimes cause leaf curling, have been found on the bark and leaves of white alder (*Alnus incana*) and Kansu hawthorn (*Crataegus kansuensis*). These insects are covered with a white, waxy substance and are easily mistaken for mealybugs. Woolly aphids can be distinguished from mealybugs by their shape—aphids are more pear-shaped and have cornicles (two pipelike structures coming out of their abdomens), although it may be hard to see the cornicles through all the wool. Mealybugs are round to oval in shape and don't have cornicles. Like other aphids, woolly aphids create honeydew. They are controlled with forceful sprays to penetrate the waxy protective coating and honeydew. Many contact insecticides, such as synthetic pyrethroids, provide effective control. *(Karel Jacobs, the Morton Arboretum; Fredric Miller and Phil Nixon)*

Home, Yard and Garden Pest Newsletter *is prepared by Extension specialists from the University of Illinois at Urbana-Champaign and the Illinois Natural History Survey. Information for this newsletter is gathered with the help of staff members, Extension field staff, and others in cooperation with the USDA Animal and Health Inspection Service.*

Major authors are Phil Nixon, (217) 333-6650, John Lloyd, (217) 333-6653, and Fredric Miller, (708) 352-0109, entomologists; Nancy Pataky, plant pathologist, (217) 333-0519; and Rhonda Ferree, Tom Voigt, and David Williams, horticulturists, (217) 333-0350. Phil Nixon is the executive editor of the Home, Yard and Garden Pest Newsletter. *This newsletter is written by faculty in the Department of Natural Resources and Environmental Sciences and the Department of Crop Sciences. The newsletter is edited by Peggy Currid, typeset by Oneda VanDyke, and proofread by Herbert Morgan, all of Information Services.*

COOPERATIVE EXTENSION SERVICE

HOME, YARD & GARDEN PEST NEWSLETTER

college of agricultural, consumer and environmental sciences university of illinois at urbana-champaign ▲ illinois natural history survey champaign

No. 13 • July 16, 1997

This newsletter is issued weekly (biweekly in the early spring and late summer) to provide timely information on insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

INSECTS

Japanese Beetle and Annual White Grub

Adult Japanese beetles and southern masked chafers (annual white grubs) are flying in the Chicago area, according to Donna Danielson of the Morton Arboretum Scouting Program. Reports of beetle emergence from central Illinois have been relatively sporadic. As was indicated in last week's newsletter, the cooler-than-normal temperatures this spring slowed grub development and delayed adult emergence.

Although time of emergence has been sporadic, recent warm, dry weather and conscientious lawn care practices have created ideal habitats for egg laying. Lawns that go dormant in the summer or that receive limited amounts of water are less attractive for egg laying than lush areas of turf that have been irrigated. Refer to last week's newsletter for turf grub management options.

As Japanese beetles continue to emerge, more damage will occur from the adults feeding on deciduous plant materials in infested areas of the state. Perhaps we should adjust our mindset and think of Japanese beetles as one of the "joys" of living in Illinois. When purchasing new plant materials, keep Japanese beetle defoliation in mind and select plant varieties that are less attractive to the beetle. If you select plants that are favored by this insect, you should get used to beetle-damaged plants or expect to treat the plants weekly with an insecticide when the beetles are present. University of Kentucky and Purdue University scientists have been conducting research to identify woody plant species that are less favored by the Japanese beetle. We will include a list of such species in next week's newsletter. *(John Lloyd, Fredric Miller, and Karel Jacobs)*

Summer Defoliators

Yellow-necked caterpillars, walnut caterpillars, and late first-generation **mimosa webworm** are still causing damage in southern Illinois and in select locations in central Illinois. Where defoliation is extremely severe or where plant appearance is the most important aspect of the landscape, treatments with any of the compounds listed for caterpillar control in the *1997 Illinois Commercial Landscape and Turf Pest Management Handbook* should eliminate current infestations. Both yellow-necked and walnut caterpillars feed as a group, so spot treatments or removal of the caterpillars by pruning or physical destruction are the most effective forms of management.

In addition to these common summer defoliators, we have been seeing some damage on willows by **spiny elm caterpillars** in the Chicago area. The larvae of this caterpillar are black, about two inches long when fully grown, and have white and burgundy spots along their backs. They also have long spines around each segment. An interesting fact about this defoliating caterpillar it becomes the mourning cloak butterfly. For some people, this poses a dilemma: What is more important—the appearance of the plant or the beauty of the insect? *(John Lloyd, Karel Jacobs, and Fredric Miller)*

Carpenter Ants in Trees

We have taken numerous calls about carpenter ant nests in trees. Carpenter ants normally do not need to be controlled in trees because they usually cause little or no damage to the tree.

Carpenter ants vary in size and color. The black carpenter ant is probably the most common species in landscapes. Worker ants are nonreproducing females that are wingless and black. Workers come in two size ranges. Minor workers are approximately 1/4 inch long and do much of the food foraging, nest construction, and larval feeding; they also attend the queen. Major workers are also wingless and black, but are about 1/2 inch long and play a major role in defending the nest and minor workers.

The black carpenter ant is the only carpenter ant in Illinois that commonly locates its nests in buildings. They tunnel out wood that is damp or decaying from roof or water-pipe leaks. (The red carpenter ant is another common species, with red, wingless workers that are about 1/4 inch long. Other, smaller species of carpenter ants are also found in Illinois.)

Carpenter ants build their nests by hollowing out rotting wood; they do not eat the wood. Workers take mouthful-sized chips of wood to the nest entrance, where they deposit the chips. This results in a pile of coarse sawdust at the base of a tree. The nest itself consists of meandering, 1/4-inch-diameter tunnels that are free of sawdust. Egg laying, larval rearing, and pupation take place within these tunnels. Nests may be present in rotting wood in trunks, limbs, or roots.

Nests that are at least five years old will contain winged reproductives. Black carpenter ant males are 1/4 inch long and have two pairs of clear wings. The queens are approximately 3/4 inch long and also have two pairs of clear wings. Both sexes emerge from the colony in early morning and fly towards the light to escape the colony. Mating occurs, and the reproductives break their wings off at weakened spots. Then they tunnel into damp, rotting wood to start a new colony.

Carpenter ant nests in trees are an indication of rotting wood. Such trees should be checked to determine whether the rot has weakened the tree enough that it becomes a hazard. Nests in trees close to a house may result in ants entering the house to forage. This nuisance can be eliminated by spraying diazinon into the nest or by pruning overhanging limbs at least three feet back from the roof. Otherwise, carpenter ant nests do not directly weaken the tree and do not usually require control. *(Phil Nixon)*

PLANT DISEASES

Aster Yellows of Annuals and Perennials

Aster yellows is most commonly found on chrysanthemum, aster, daisy, marigold, and petunia, but it occurs on many other species as well. Affected plants are easy to identify: they appear yellowish, stunted, stiff, erect, and bushy. The flowers may be deformed, with partially or totally green, leafy petals. The plants look like they have been infected by a virus.

Aster yellows is a disease caused by a phytoplasma (formerly known as mycoplasma). Phytoplasmas are pathogens similar to fungi, bacteria, and viruses—specifically, an organism between a bacterium and a viral pathogen. The important things to remember about phytoplasmas are that they are transmitted by sucking insects (in the case of aster yellows, by leafhoppers) and they cannot be cultured in a laboratory.

Because the pathogen can be transmitted by leafhoppers, control measures include destroying all affected plants when they are first seen, eliminating broadleaf weeds, and, of course, buying symptom-free plants. Spraying regularly to keep leafhoppers from feeding may be beneficial in a commercial setting.

We do not see many aster yellows samples in the lab. Part of the reason is that such plants are rogued before they reach retail outlets. Symptoms are easy to identify by comparing the suspect plant to disease-identification photos. The pathogen cannot be cultured in the lab, so sending a sample to the Plant Clinic is not necessary. For a detailed description of aster yellows, consult *Report on Plant Diseases* No. 903. *(Nancy Pataky)*

Bacterial Leafspot of Stone Fruits

This disease is caused by a bacterium (*Xanthomonas*) that thrives in the rainy June and July weather we have experienced throughout most of the state (apologies to

those of you who still have dry weather). Look for the disease on peach, nectarine, almond, apricot, plum, prune, and cherry, as well their ornamental equivalents.

Numerous spots (from as small as a pinprick up to 1/5 inch in diameter) form in the leaves. At first these spots are circular and watersoaked, but soon enlarge to become angular and deep purple to rusty brown or black. The centers of the spots often dry out and tear away, so you may notice only a shot-hole appearance or even a wind-tattered effect.

Infected leaves turn yellow and drop early. Although symptoms resemble those of nitrogen deficiency, that deficiency usually results in holes concentrated near the midvein on the leaf. This bacterium also attacks twigs and fruit, reducing fruit quality and yield or reducing aesthetic appeal in the case ornamental species.

Some peach cultivars have resistance to bacterial leafspot. Most apricot varieties are susceptible, as are many nectarine varieties. Some resistant cultivars of peach are listed in *Report on Plant Diseases* No. 810, Bacterial Spot of Stone Fruits.

If you have a mature tree and do not wish to consider replacement with a resistant variety, use balanced fertility practices and open the trees through pruning so that air circulation is improved. These steps will make conditions less conducive to disease development. *(Nancy Pataky)*

Russian Olive Cankers

Cankers occur on a great deal of the woody plant material we see at the Plant Clinic. Cankers are generally caused by secondary, or stress, pathogens and are only a part of the problem. They are merely a clue that something more is wrong.

A canker is a dead area, usually on a woody plant, that often results in an open wound. Starting as a small, sharply delimited, usually round-to-oval or elongate lesion, a canker might enlarge and girdle the cane, twig, limb, trunk, or root. The canker indicates the area of the cambium that has been killed; the sapwood underneath is generally brown or black. The canker itself may be thickened and rough or it may appear sunken. On very tightly barked trees, a color difference in the bark may be all that delineates the canker. Cutting into the affected area with a knife will reveal that the cankered area has brown inner wood, while the healthy area is white or green.

Russian olive trees suffer from many cankers. The principal ones are caused by such fungi as *Phomopsis, Lasiodiplodia (Botryodiplodia), Nectria (Tubercularia)*, and *Phytophthora.*

In Illinois, the most important canker by far is Phomopsis. Unlike other canker fungi, *Phomopsis* is an aggressive pathogen that can attack and kill vigorous trees. Trees seriously injured by drought, hail, or ice are subject to decline and more rapid spread of the disease. *Phomopsis*-infected trees often appear ragged, with several dying or dead twigs and branches. Current-season twigs and small branches often wilt and die, with the dead, withered leaves hanging on for some time. Oval-to-elongate, sunken cankers are most evident on the large branches and trunks.

Diseased bark on Phomopsis cankers varies from orange-brown to dark reddish brown. Ridges often form around the canker margins. Branches girdled by the enlarging and encircling cankers wilt and die. The white sapwood beneath the cankers turns dark brown to black and extends beyond the margins. Minute, slightly raised, rounded pustules of the *Phomopsis* fungus are embedded in the dead, cankered bark.

Avoid all unnecessary bark wounds because they are the pathogen's main avenue of entry. All seriously infected trees showing dieback should be cut off near the ground and destroyed, preferably by burning. More details on this disease can be found in *Report on Plant Diseases* No. 606. *(Nancy Pataky)*

Sclerotinia White Mold

This is a fungal disease that we see only in very wet years. Many ornamental crops could be affected, including begonia, daisy, delphinium, hydrangea, marigold, pansy, and zinnia. Vegetable crops commonly affected are tomato, green bean, and pepper.

White mold is caused by *Sclerotinia*, a fungus that thrives in cool, wet weather. Due to near ideal conditions in many parts of Illinois, this disease should be expected. The fungus remains in a resting state (sclerotia) in the soil for many years. With ideal conditions, fruiting bodies (apothecia) form and spores are released into the air. A period of wet

weather is then required for infection to follow the spore release. It is easy to understand why the alternating wet and dry periods experienced in some parts of the state have been ideal for Sclerotinia white mold.

Symptoms of white mold are bleached areas on the stems and at the leaf axils. These areas appear almost like animal bones dried in the sun. In cool, wet weather, a white fluffy mold develops on the bleached areas. Within seven to ten days, sclerotia form: large, black structures, almost like rabbit droppings, found inside the stem (and occasionally on the outside as well).

Control options for this disease are limited. The home grower can try to keep plant density low so that air movement helps dry out plants sooner. There are no rescue treatments available for commercial use. Fungicide applications may help on a preventive basis in areas where this is a problem every year. For chemical options, consult the *1997 Illinois Commercial Turf and Ornamental Pest Management Handbook. (Nancy Pataky)*

Home, Yard and Garden Pest Newsletter *is prepared by Extension specialists from the University of Illinois at Urbana-Champaign and the Illinois Natural History Survey. Information for this newsletter is gathered with the help of staff members, Extension field staff, and others in cooperation with the USDA Animal and Health Inspection Service.*

Major authors are Phil Nixon, (217) 333-6650, John Lloyd, (217) 333-6653, and Fredric Miller, (708) 352-0109, entomologists; Nancy Pataky, plant pathologist, (217) 333-0519; Rhonda Ferree, Tom Voigt, and David Williams, horticulturists, (217) 333-0350, and Karel Jacobs, plant pathologist, the Morton Arboretum, (630) 719-5646. Phil Nixon is the executive editor of the Home, Yard and Garden Pest Newsletter. *This newsletter is written by faculty in the Department of Natural Resources and Environmental Sciences and the Department of Crop Sciences.*

COOPERATIVE EXTENSION SERVICE

HOME, YARD & GARDEN PEST NEWSLETTER

college of agricultural, consumer and environmental sciences, university of illinois at urbana-champaign ▲ illinois natural history survey, champaign

No. 14 • July 23, 1997

This newsletter is issued weekly (biweekly in the early spring and late summer) to provide timely information on insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

PLANT DISEASES

Oops!

Issue number 12 of this newsletter contained an article on leaf scorch of trees. In that article, we referred to *Report on Plant Diseases* No. 520. The correct number for the leaf scorch *RPD* is No. 620. Our apologies. *(Nancy Pataky)*

Tomato Wilts

Wilt diseases of tomato are caused by three different pathogens, as well as a toxin produced by walnut roots. Walnut wilt of tomato, which is noninfectious, produces symptoms similar to the wilts caused by pathogens, including a brown discoloration of internal woody tissue. Other noninfectious causes of tomato wilt include flooding or rotting of roots, some herbicide injuries, and mechanical injury to the roots or stem.

The infectious vascular wilt pathogens of tomato include bacteria and two fungi. *Fusarium* and *Verticillium* are fungi that cause the very similar Fusarium wilt and Verticillium wilt diseases. Infected plants might be somewhat stunted, and leaves will turn yellow and die, often starting at the base of the plant and progressing upward. Leaves on one side of the plant could show symptoms, while leaves on the other side appear normal. Wilting might occur at or during the hottest part of the day or when the plants are stressed from dryness or a heavy fruit load. Infected leaves might dry up before the wilting is detected, so initial symptoms may appear as stems with dead leaves. Both fungal diseases cause discoloration of the vascular (woody) tissues.

With Fusarium wilt, the vascular tissue of stems and petioles throughout the plant becomes brown to reddish brown. With Verticillium wilt, only the lower stem becomes discolored—grayish, in this case. This distinction is not always clear cut, however, and laboratory isolation is required to distinguish these two pathogens. Both fungi are soilborne and infect plants through root systems; both are able to survive in soils in the absence of a susceptible tomato plant for many years. Fusarium can also be seedborne.

Bacterial wilt is caused by a *Pseudomonas* species and affects potatoes, eggplants, and peppers, as well as tomatoes. This pathogen causes a sudden wilt of the plant without leaves first discoloring. The center of the stem will be water-soaked at first, then brown, and eventually may become hollow. If the plant wilts as described but does not show any stem discoloration, carefully dig up and inspect roots for root rot. Roots injured by excess water and/or root rot will also cause these symptoms.

Disease resistance is the most common and economically practical means of controlling the fungal diseases. Tomato varieties labeled "VFN" have resistance to *Verticillium*, one or more races of *Fusarium,* and nematodes. Occasionally the question arises: Why do my VFN tomatoes have symptoms of Verticillium or Fusarium wilt? The first possibility is that the symptoms are the result of something other than these two diseases. Or, it may be that the plants were not actually the variety labeled. Another possible explanation is that the particular variety of tomato has been infected by a race of the fungus to which the plant is not resistant.

Rotation out of an affected area for five to seven years can help reduce the incidence of Verticillium

ACES College of Agricultural, Consumer and Environmental Sciences, University of Illinois at Urbana-Champaign

Helping You Put Knowledge to Work—State • County • Local Groups
U.S. Department of Agriculture Cooperating
The Cooperative Extension Service provides equal opportunities in programs and employment.

wilt; shorter rotations will be of little benefit. Removing infected plant parts, including roots, might reduce the buildup of inoculum. Research shows that using nitrate forms of nitrogen can help reduce the severity of Fusarium wilt, while ammonium forms promote disease development. Because *Fusarium* fungi favor low soil pH, increasing the pH to a range of 6 to 7 can help control the Fusarium wilt. A pH higher than 7.5 increases problems with Verticillium wilt. Details on the wilts of tomato can be found in *Report on Plant Diseases* No. 929. Details on Verticillium wilt on many crops can be found in *Report on Plant Diseases* No. 1010. *(Nancy Pataky)*

Witches' Brooms

Many plants develop a symptom known as witches' brooms. On woody plants, this appears as a proliferation of shoots from one point, like a broom. The cause of these symptoms varies with the host. Cherry and blackberry witches' brooms are caused by fungi. Other witches' brooms are the result of phytoplasmas.

Witches' broom of common hackberry is thought to be caused by a powdery mildew fungus in association with an eriophyid mite. This is such a common condition on Illinois common hackberry trees that one would think that witches' brooms were a characteristic of the species. Many of the twigs in a broom will die back in the winter. Buds on the surviving twigs are numerous, larger than normal, usually grayish, and have looser scales than normal buds do. The overall effect on the tree is many clumps of thick growth throughout the canopy. The brooms may be unpleasant in appearance but will not kill a hackberry tree.

As far as we know, there are no practical control measures for witches' brooms on hackberry. If you want a tree without the brooms, do not plant a common hackberry. Sugarberry is less frequently affected, and both Chinese hackberry and Jesso hackberry are considered resistant. A *Report on Plant Diseases* (No. 662) on this condition is available. *(Nancy Pataky)*

Viruses of Brambles

Viral diseases of brambles cause a range of symptoms. Generally, the infected plant has low vigor. The leaves may be yellowish, with a light to dark green mottling. Leaves may also be blistered or puckered, dwarfed, curled, wrinkled, and cupped downward (with the mosaic types).

The leaf curl viruses generally cause slight stunting and bushy growth with small, dark green, bunchy, stiff, tightly curled leaves. These symptoms are also very similar to those caused by some growth regulator herbicides. Look closely at the pattern in the bramble patch. Herbicide injury will be more intense near the source of the herbicide and progressively less intense moving away from the source. Other broadleaf plants will likely show symptoms as well, and all at about the same time. Viruses are more likely to occur on scattered plants and to spread slowly during the season. Viruses tend to be fairly specific to one type of plant species.

Viral diseases reduce the yield and fruit quality of bramble fruits more than they do for most other fruit crops. Once infected, plants remain so for life. The virus particle needs a live plant cell in which to multiply and spread. It cannot be cultured, extracted, or induced to sporulate in a lab. The viruses are spread by the feeding of aphids, but not by pruning or other mechanical injuries.

You cannot kill or inhibit virus particles with sprays. Control involves destroying all infected cultivated and wild brambles within 1,000 feet, if possible. Start new plantings with certified virus-free plants. If growing both black and red raspberries, separate them by at least 150 feet to reduce virus cross-infection. Maintain strict aphid control at all times. For more information, refer to *Report on Plant Diseases* No. 710. *(Nancy Pataky)*

INSECTS

Japanese Beetles

Although adult Japanese beetles have emerged throughout much of Illinois, the numbers appear to be low. In Ohio, beetles were few in number for a week or two, but then started emerging more heavily. Many pupae are still in the soil. Most of these pupae are still in the mid stages of development; the adults will probably not emerge for another couple of weeks—probably creating an extended emergence pattern in Ohio with an associated extended feeding period by the adults. In Illinois, it remains to be seen whether this pattern will be followed. Japanese beetles do better in damp soils; because the past fall and spring were average to dry in much of Illinois, we may not experience a very large emergence of beetles this year.

If we do have an extended period of emergence, susceptible trees and shrubs may need to be re-treated more often than usual. Be sure to monitor regularly and re-treat when necessary. There is nothing new in

the way of pesticide controls. The standard treatments are Sevin (carbaryl), Dursban (chlorpyrifos), and Orthene (acephate). However, the pyrethroids—Astro (permethrin), Scimitar (lambda-cyhalothrin), Talstar (bifenthrin), and Tempo (cyfluthrin)—are favored by professional landscape managers. Wetable powders and flowable formulations seem to have the longest residual activity. In Illinois, we performed limited tests of a Japanese beetle repellent containing azadirachtin and found Sevin to be most effective in keeping the beetles off susceptible plants.

Fellow entomologist Dan Potter (University of Kentucky) has been conducting research on Japanese beetle adult feeding and has some interesting findings. Dan and his students were interested in why Japanese beetles seem to cluster on some plants in the landscape and not others, even if the plants are the same species. Potter has gathered some intriguing data indicating that the adult beetles' attraction to pheromones may be one component of the clustering behavior. (Pheromones are chemicals produced by the beetles to attract other beetles for feeding and mating.)

The other major factor that caused groups of beetles to amass on one plant was the feeding damage itself. Plants that were skeletonized seem to release odors that attract even more beetles. Removing leaves and flowers that have been damaged by Japanese beetles may reduce further feeding. Removed plant material should be disposed of, not just dropped on the ground beneath the plant.

We do not recommend using the Japanese beetle traps that are sold in garden stores and seed catalogs. All evidence suggests that the traps attract more beetles into a landscape than would be there in the first place. The traps are also only marginally effective in trapping the population that may be present. However, it's difficult to convince the homeowner who is proudly holding a bag of several hundred beetles that the traps are not effective. You might try a numbers game to illustrate how ineffective the traps are at controlling the Japanese beetle population. One Japanese beetle grub per square foot of turf translates to 43,500 beetles in an acre of turf. If you capture 1,000 beetles in a trap, what percentage of the population have you eliminated? Do the math! *(Dave Shetlar, The Ohio State University; Phil Nixon)*

Japanese Beetle Host Plants

As we explained in last week's newsletter, because Japanese beetle is relatively new in many areas of the state, landscape designers and homeowners may be unaware of the beetle's feeding preferences. The Japanese beetle's most- and least-favored woody plants in Illinois are listed below. We hope this information will be useful to people designing new landscapes in areas infested by this beetle. The information was provided by Dr. Cliff Sadof from Purdue University. *(John Lloyd)*

Least Favored by Japanese Beetle

Box elder
Dogwood
Euonymus
Green ash
Holly
Lilac
Mulberry
Persimmon
Red maple
Silver maple
Sweet gum
White ash
Yellow poplar (tuliptree)

Most Favored by Japanese Beetle

Birch
Black walnut
Elm
Grape
Hollyhock
Japanese maple
Linden
London planetree
Malus spp. (crabapple, etc.)
Norway maple
Prunus spp. (flowering cherry, etc.)
Rose
Sassafras

Annual White Grub

Annual white grub adults have been numerous in central Illinois since July 13—about ten days later than usual. These beetles were also reported at the Morton Arboretum in northeastern Illinois the previous week. The number of beetles that we have seen indicates this is a normal emergence. With the turf being dry and brownish in nonirrigated areas, egg laying is likely to be concentrated in watered lawns and other turf.

Heavily irrigated turf areas should be treated over the next couple of weeks with imidicloprid (Merit, Grubex) or halofenozide (Mach 2). Be sure to water the turf (at least 1/2 inch) after the application to move the insecticide into the root zone where the grubs live. Do not allow liquid applications to dry on the grass blades before they are watered in.

Less-heavily watered turf should be scouted for grubs in the second week of August. Areas with high grub populations can be treated with a quicker-acting insecticide such as trichlorfon (Dylox, Proxol), bendiocarb (Turcam, Intercept), or diazinon to avoid later turf damage. *(Phil Nixon)*

Home, Yard and Garden Pest Newsletter *is prepared by Extension specialists from the University of Illinois at Urbana-Champaign and the Illinois Natural History Survey. Information for this newsletter is gathered with the help of staff members, Extension field staff, and others in cooperation with the USDA Animal and Health Inspection Service.*

Major authors are Phil Nixon, (217) 333-6650, John Lloyd, (217) 333-6653, and Fredric Miller, (708) 352-0109, entomologists; Nancy Pataky, plant pathologist, (217) 333-0519; Rhonda Ferree, Tom Voigt, and David Williams, horticulturists, (217) 333-0350, and Karel Jacobs, plant pathologist, the Morton Arboretum, (630) 719-5646. Phil Nixon is the executive editor of the Home, Yard and Garden Pest Newsletter. *This newsletter is written by faculty in the Department of Natural Resources and Environmental Sciences and the Department of Crop Sciences. The newsletter is edited by Peggy Currid, typeset by Oneda VanDyke, and proofread by Herbert Morgan, all of Information Services.*

COOPERATIVE EXTENSION SERVICE

HOME, YARD & GARDEN PEST NEWSLETTER

college of agricultural, consumer and environmental sciences, university of illinois at urbana-champaign ▲ illinois natural history survey, champaign

No. 14 • July 23, 1997

This newsletter is issued weekly (biweekly in the early spring and late summer) to provide timely information on insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

PLANT DISEASES

Oops!

Issue number 12 of this newsletter contained an article on leaf scorch of trees. In that article, we referred to *Report on Plant Diseases* No. 520. The correct number for the leaf scorch *RPD* is No. 620. Our apologies. *(Nancy Pataky)*

Tomato Wilts

Wilt diseases of tomato are caused by three different pathogens, as well as a toxin produced by walnut roots. Walnut wilt of tomato, which is noninfectious, produces symptoms similar to the wilts caused by pathogens, including a brown discoloration of internal woody tissue. Other noninfectious causes of tomato wilt include flooding or rotting of roots, some herbicide injuries, and mechanical injury to the roots or stem.

The infectious vascular wilt pathogens of tomato include bacteria and two fungi. *Fusarium* and *Verticillium* are fungi that cause the very similar Fusarium wilt and Verticillium wilt diseases. Infected plants might be somewhat stunted, and leaves will turn yellow and die, often starting at the base of the plant and progressing upward. Leaves on one side of the plant could show symptoms, while leaves on the other side appear normal. Wilting might occur at or during the hottest part of the day or when the plants are stressed from dryness or a heavy fruit load. Infected leaves might dry up before the wilting is detected, so initial symptoms may appear as stems with dead leaves. Both fungal diseases cause discoloration of the vascular (woody) tissues.

With Fusarium wilt, the vascular tissue of stems and petioles throughout the plant becomes brown to reddish brown. With Verticillium wilt, only the lower stem becomes discolored—grayish, in this case. This distinction is not always clear cut, however, and laboratory isolation is required to distinguish these two pathogens. Both fungi are soilborne and infect plants through root systems; both are able to survive in soils in the absence of a susceptible tomato plant for many years. Fusarium can also be seedborne.

Bacterial wilt is caused by a *Pseudomonas* species and affects potatoes, eggplants, and peppers, as well as tomatoes. This pathogen causes a sudden wilt of the plant without leaves first discoloring. The center of the stem will be water-soaked at first, then brown, and eventually may become hollow. If the plant wilts as described but does not show any stem discoloration, carefully dig up and inspect roots for root rot. Roots injured by excess water and/or root rot will also cause these symptoms.

Disease resistance is the most common and economically practical means of controlling the fungal diseases. Tomato varieties labeled "VFN" have resistance to *Verticillium*, one or more races of *Fusarium,* and nematodes. Occasionally the question arises: Why do my VFN tomatoes have symptoms of Verticillium or Fusarium wilt? The first possibility is that the symptoms are the result of something other than these two diseases. Or, it may be that the plants were not actually the variety labeled. Another possible explanation is that the particular variety of tomato has been infected by a race of the fungus to which the plant is not resistant.

Rotation out of an affected area for five to seven years can help reduce the incidence of Verticillium

ACES College of Agricultural, Consumer and Environmental Sciences, University of Illinois at Urbana-Champaign

Helping You Put Knowledge to Work—State • County • Local Groups
U.S. Department of Agriculture Cooperating
The Cooperative Extension Service provides equal opportunities in programs and employment.

wilt; shorter rotations will be of little benefit. Removing infected plant parts, including roots, might reduce the buildup of inoculum. Research shows that using nitrate forms of nitrogen can help reduce the severity of Fusarium wilt, while ammonium forms promote disease development. Because *Fusarium* fungi favor low soil pH, increasing the pH to a range of 6 to 7 can help control the Fusarium wilt. A pH higher than 7.5 increases problems with Verticillium wilt. Details on the wilts of tomato can be found in *Report on Plant Diseases* No. 929. Details on Verticillium wilt on many crops can be found in *Report on Plant Diseases* No. 1010. *(Nancy Pataky)*

Witches' Brooms

Many plants develop a symptom known as witches' brooms. On woody plants, this appears as a proliferation of shoots from one point, like a broom. The cause of these symptoms varies with the host. Cherry and blackberry witches' brooms are caused by fungi. Other witches' brooms are the result of phytoplasmas.

Witches' broom of common hackberry is thought to be caused by a powdery mildew fungus in association with an eriophyid mite. This is such a common condition on Illinois common hackberry trees that one would think that witches' brooms were a characteristic of the species. Many of the twigs in a broom will die back in the winter. Buds on the surviving twigs are numerous, larger than normal, usually grayish, and have looser scales than normal buds do. The overall effect on the tree is many clumps of thick growth throughout the canopy. The brooms may be unpleasant in appearance but will not kill a hackberry tree.

As far as we know, there are no practical control measures for witches' brooms on hackberry. If you want a tree without the brooms, do not plant a common hackberry. Sugarberry is less frequently affected, and both Chinese hackberry and Jesso hackberry are considered resistant. A *Report on Plant Diseases* (No. 662) on this condition is available. *(Nancy Pataky)*

Viruses of Brambles

Viral diseases of brambles cause a range of symptoms. Generally, the infected plant has low vigor. The leaves may be yellowish, with a light to dark green mottling. Leaves may also be blistered or puckered, dwarfed, curled, wrinkled, and cupped downward (with the mosaic types).

The leaf curl viruses generally cause slight stunting and bushy growth with small, dark green, bunchy, stiff, tightly curled leaves. These symptoms are also very similar to those caused by some growth regulator herbicides. Look closely at the pattern in the bramble patch. Herbicide injury will be more intense near the source of the herbicide and progressively less intense moving away from the source. Other broadleaf plants will likely show symptoms as well, and all at about the same time. Viruses are more likely to occur on scattered plants and to spread slowly during the season. Viruses tend to be fairly specific to one type of plant species.

Viral diseases reduce the yield and fruit quality of bramble fruits more than they do for most other fruit crops. Once infected, plants remain so for life. The virus particle needs a live plant cell in which to multiply and spread. It cannot be cultured, extracted, or induced to sporulate in a lab. The viruses are spread by the feeding of aphids, but not by pruning or other mechanical injuries.

You cannot kill or inhibit virus particles with sprays. Control involves destroying all infected cultivated and wild brambles within 1,000 feet, if possible. Start new plantings with certified virus-free plants. If growing both black and red raspberries, separate them by at least 150 feet to reduce virus cross-infection. Maintain strict aphid control at all times. For more information, refer to *Report on Plant Diseases* No. 710. *(Nancy Pataky)*

INSECTS

Japanese Beetles

Although adult Japanese beetles have emerged throughout much of Illinois, the numbers appear to be low. In Ohio, beetles were few in number for a week or two, but then started emerging more heavily. Many pupae are still in the soil. Most of these pupae are still in the mid stages of development; the adults will probably not emerge for another couple of weeks—probably creating an extended emergence pattern in Ohio with an associated extended feeding period by the adults. In Illinois, it remains to be seen whether this pattern will be followed. Japanese beetles do better in damp soils; because the past fall and spring were average to dry in much of Illinois, we may not experience a very large emergence of beetles this year.

If we do have an extended period of emergence, susceptible trees and shrubs may need to be re-treated more often than usual. Be sure to monitor regularly and re-treat when necessary. There is nothing new in

the way of pesticide controls. The standard treatments are Sevin (carbaryl), Dursban (chlorpyrifos), and Orthene (acephate). However, the pyrethroids—Astro (permethrin), Scimitar (lambda-cyhalothrin), Talstar (bifenthrin), and Tempo (cyfluthrin)—are favored by professional landscape managers. Wetable powders and flowable formulations seem to have the longest residual activity. In Illinois, we performed limited tests of a Japanese beetle repellent containing azadirachtin and found Sevin to be most effective in keeping the beetles off susceptible plants.

Fellow entomologist Dan Potter (University of Kentucky) has been conducting research on Japanese beetle adult feeding and has some interesting findings. Dan and his students were interested in why Japanese beetles seem to cluster on some plants in the landscape and not others, even if the plants are the same species. Potter has gathered some intriguing data indicating that the adult beetles' attraction to pheromones may be one component of the clustering behavior. (Pheromones are chemicals produced by the beetles to attract other beetles for feeding and mating.)

The other major factor that caused groups of beetles to amass on one plant was the feeding damage itself. Plants that were skeletonized seem to release odors that attract even more beetles. Removing leaves and flowers that have been damaged by Japanese beetles may reduce further feeding. Removed plant material should be disposed of, not just dropped on the ground beneath the plant.

We do not recommend using the Japanese beetle traps that are sold in garden stores and seed catalogs. All evidence suggests that the traps attract more beetles into a landscape than would be there in the first place. The traps are also only marginally effective in trapping the population that may be present. However, it's difficult to convince the homeowner who is proudly holding a bag of several hundred beetles that the traps are not effective. You might try a numbers game to illustrate how ineffective the traps are at controlling the Japanese beetle population. One Japanese beetle grub per square foot of turf translates to 43,500 beetles in an acre of turf. If you capture 1,000 beetles in a trap, what percentage of the population have you eliminated? Do the math! *(Dave Shetlar, The Ohio State University; Phil Nixon)*

Japanese Beetle Host Plants

As we explained in last week's newsletter, because Japanese beetle is relatively new in many areas of the state, landscape designers and homeowners may be unaware of the beetle's feeding preferences. The Japanese beetle's most- and least-favored woody plants in Illinois are listed below. We hope this information will be useful to people designing new landscapes in areas infested by this beetle. The information was provided by Dr. Cliff Sadof from Purdue University. *(John Lloyd)*

Least Favored by Japanese Beetle

Box elder
Dogwood
Euonymus
Green ash
Holly
Lilac
Mulberry
Persimmon
Red maple
Silver maple
Sweet gum
White ash
Yellow poplar (tuliptree)

Most Favored by Japanese Beetle

Birch
Black walnut
Elm
Grape
Hollyhock
Japanese maple
Linden
London planetree
Malus spp. (crabapple, etc.)
Norway maple
Prunus spp. (flowering cherry, etc.)
Rose
Sassafras

Annual White Grub

Annual white grub adults have been numerous in central Illinois since July 13—about ten days later than usual. These beetles were also reported at the Morton Arboretum in northeastern Illinois the previous week. The number of beetles that we have seen indicates this is a normal emergence. With the turf being dry and brownish in nonirrigated areas, egg laying is likely to be concentrated in watered lawns and other turf.

Heavily irrigated turf areas should be treated over the next couple of weeks with imidicloprid (Merit, Grubex) or halofenozide (Mach 2). Be sure to water the turf (at least 1/2 inch) after the application to move the insecticide into the root zone where the grubs live. Do not allow liquid applications to dry on the grass blades before they are watered in.

Less-heavily watered turf should be scouted for grubs in the second week of August. Areas with high grub populations can be treated with a quicker-acting insecticide such as trichlorfon (Dylox, Proxol), bendiocarb (Turcam, Intercept), or diazinon to avoid later turf damage. *(Phil Nixon)*

Home, Yard and Garden Pest Newsletter *is prepared by Extension specialists from the University of Illinois at Urbana-Champaign and the Illinois Natural History Survey. Information for this newsletter is gathered with the help of staff members, Extension field staff, and others in cooperation with the USDA Animal and Health Inspection Service.*

Major authors are Phil Nixon, (217) 333-6650, John Lloyd, (217) 333-6653, and Fredric Miller, (708) 352-0109, entomologists; Nancy Pataky, plant pathologist, (217) 333-0519; Rhonda Ferree, Tom Voigt, and David Williams, horticulturists, (217) 333-0350, and Karel Jacobs, plant pathologist, the Morton Arboretum, (630) 719-5646. Phil Nixon is the executive editor of the Home, Yard and Garden Pest Newsletter. *This newsletter is written by faculty in the Department of Natural Resources and Environmental Sciences and the Department of Crop Sciences. The newsletter is edited by Peggy Currid, typeset by Oneda VanDyke, and proofread by Herbert Morgan, all of Information Services.*

COOPERATIVE EXTENSION SERVICE

HOME, YARD & GARDEN PEST NEWSLETTER

college of agricultural, consumer and environmental sciences, university of illinois at urbana-champaign ▲ illinois natural history survey, champaign

No. 15 • July 30, 1997

This newsletter is issued weekly (biweekly in the early spring and late summer) to provide timely information on insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

INSECTS

Annual White Grubs

Adult annual white grubs are still flying in east central Illinois, which means that egg laying is still occurring. As we move into August, keep a lookout for damaged turf in irrigated areas where preventive treatments with imidacloprid (Merit, Grubex) or halofenozide (Mach 2) have not been applied.

As damage starts to occur, lawns in which more than 10 or 12 annual white grub larvae are present per square foot may require rescue treatments with trichlorfon (Dylox, Proxol), bendiocarb (Turcam, Intercept), or diazinon to reduce turf damage. Drench treated areas with at least 1/2 an inch of water within 30 minutes of the insecticide application to move the insecticide into the root zone where the larvae are feeding. To avoid turf damage by native wildlife that feed on grubs (raccoons and skunks, for example), treatments may be necessary at grub populations lower than 10 or 12 per square foot. *(John Lloyd)*

Dog-Day Cicadas and Cicada Killers

I'm always comforted by the first drone of dog-day cicadas in the trees, knowing that full summer has arrived when I hear this sound. While most people call these buzzing critters "locusts," cicadas are not related to grasshoppers in any way. Apparently, tree-dwelling grasshoppers are present in Europe, and early settlers called our chirping cicadas "locusts," assuming that they were the same as the locusts in Europe.

The dog-day cicadas take only a year or two to complete their development. Unlike the periodical cicadas that take 13 to 17 years to complete development, dog-day cicadas appear each summer. The common Illinois species is almost a solid light green, although there is another species that is tan with darker markings on the thorax. The periodical cicadas are black with red-orange wings and red eyes.

Occasionally, you'll hear the dog-day cicada's song interrupted by a distinct screech. This indicates an attack by predatory birds or the cicada killer wasp. Not surprisingly, we have been receiving many phone calls about cicada killers as well as several other "ground" or "sand" wasps. The cicada killer is the largest and most impressive of this group. Adult females can be as long as 1-1/2 inches, with a wing span of three inches. People describe these wasps as "incredibly large and mean looking." The bodies are black and marked with white or yellow; the wings are red-orange.

Cicada killer females dig holes in the ground, usually in sandy areas, that may extend several feet down. At the base of these burrows, they construct cells in which they place a paralyzed cicada. An egg is attached to each cicada and the wasp grub dines on the cicada for the rest of the summer.

Female cicada killers usually go about their business digging burrows, capturing cicadas, and laying eggs. They may buzz about if you approach their burrow, but they are relatively tame. The males are another story. Male cicada killers are quite territorial and they will "buzz-strafe" and "dive bomb" any other wasp, animal, or person that enters their territory. Fortunately, the males do not have a stinger, so they can only intimidate intruders.

ACES College of Agricultural, Consumer and Environmental Sciences, University of Illinois at Urbana-Champaign

Helping You Put Knowledge to Work—State • County • Local Groups
U.S. Department of Agriculture Cooperating
The Cooperative Extension Service provides equal opportunities in programs and employment.

The other common sand wasps, especially those in the genus Bimbex, make smaller burrows in sandy areas (golf course bunkers and playground sand boxes). The common Bimbex is black with greenish white markings and is less than one inch long. This wasp is beneficial because it feeds its larvae with adult horse and deer flies. As you can imagine, control is not recommended for these wasps unless there is a real risk of being stung. Most of these wasps are extremely docile and require major provocation to sting. They will not attack even if their nests are disturbed, although they may make intimidating buzzing noises.

For people who insist upon or require wasp control, dusting the individual openings with carbaryl (Sevin) will provide excellent control. (Areawide sprays seem to have little effect on these ground-nesting wasps.) Just a little of the dust over the hole is all that is needed. You don't have to turn the ground white! *(Dave Shetlar, The Ohio State University; John Lloyd)*

New Publications

The Good Guys! Natural Enemies of Insects is a set of 31 laminated cards that provide full-color photos and life history information on beneficial natural enemies of insects. The cards were developed and produced by Mike Jeffords, Sue Post, and Rob Wiedenmann from the Illinois Natural History Survey and Cliff Sadof from Purdue University. The cards are available for $8 from the Distribution Office, Illinois Natural History Survey, 607 East Peabody Drive, Champaign, IL 61820, (217) 333-6880.

Plant Health Care practitioners and other professionals will be interested in a new publication: *Plant Health Care for Woody Ornamentals: A Professional's Guide to Preventing and Managing Environmental Stresses and Pests* ($45). This comprehensive manual contains information on such topics as understanding stress and pest complexes, diagnosis and management of disorders and diseases, management of insect and vertebrate pests, and weed management. To order, call (217) 333-2007. *(John Lloyd)*

PLANT DISEASES

Rust of Turfgrasses

All turfgrasses can be infected with rust fungi, but Kentucky bluegrass, perennial ryegrass, tall fescue, and zoysiagrass tend to be most susceptible. Early symptoms of rust diseases include light yellow flecks on leaves and stems. The early stage is barely discernible—you might notice a slight yellow cast to the lawn. The flecks enlarge until spores of the fungus are produced, causing the leaf tissue to rupture and expose powdery, spore-filled spots known as rust pustules. The pustules may be yellow, orange, brown, or red. The spores rub off very easily on hands, shoes, clothing, and animals. These diseases are called "rusts" because the pustules resemble metal rust. One of our colleagues said that he had been working in his yard recently and discovered that his white shoes had become orange from the new crop of rust in his lawn.

Severely infected turf appears thin and tinted yellow, red, or brown, depending on the fungus. The turf becomes weakened, unsightly, and more susceptible to injury from environmental stresses and attack by other pathogens.

Most rusts of turfgrasses thrive during a period of four to eight hours of low light intensity, with temperatures between 70°F and 80°F, high humidity, and heavy dews or light rains, followed by eight to sixteen hours of high light, high temperatures, and slow drying of leaf surfaces. There are also a few cool-season rust diseases. This may seem a bit complex, but to put it simply, the rusts favor warm, cloudy, humid conditions followed by hot, sunny conditions. Much of Illinois has experienced these conditions in the last two weeks.

Grasses growing slowly under stressful environmental conditions are most susceptible to rust, particularly when water, fertility, and soil compaction are inadequate for good growth. Of course, some cultivars are susceptible to rust even when not under stress. Regardless, control measures should target stress areas. Leaf wetness is required for infection, so it is important to water early in the day so the turf can dry before night. Water turf infrequently but to a depth of six inches or more at each watering. Avoid frequent, light sprinklings. Fertilize to keep the grass growing about one inch per week in summer and early fall droughts. Use a balanced fertilizer. Do not apply excessive nitrogen. As the grass grows, it pushes rust-infected leaves outward, making it easy to mow and remove infected blades. Mow regularly to remove infected leaf tips, but avoid mowing below the recommended height for the particular turf species/cultivar. Prune surrounding trees and shrubs to improve light penetration and air circulation around densely shaded areas.

Badly infected areas of turf may have to be renovated and reseeded, ideally in mid- to late August. Be

certain to use a blend of turf cultivars with resistance to rust, as listed in *Report on Plant Diseases* No. 412. Preventive fungicides are available but offer only a temporary solution. Products registered for rust control on turf are listed in the *1997 Illinois Commercial Turf and Landscape Pest Management Handbook. (Nancy Pataky and Lindsey duToit)*

Powdery Mildew Update

Powdery mildew was discussed in issue number 11 of this newsletter, when the disease was just beginning to appear. It is now present in many gardens, especially those with dense plantings and tree cover. Powdery mildew develops best on warm to hot days, cool nights, and under conditions that cause dew to form on leaves. The disease has been found on lilacs, zinnias, crabapples, dogwoods, sycamores, turf, and many other hosts. *(Nancy Pataky)*

Brown Rot of Stone Fruits

This fungal disease causes an easily distinguishable fluffy, brown rot of the fruit of peach, nectarine, plum, prune, sweet and sour cherry, apricot, almond, and Japanese quince trees, as well as on the ornamental varieties. Already this summer we have seen brown rot on a few cherry samples because conditions have been ideal for the development of the fungal pathogen. The disease is most severe in areas with frequent spring and summer rains.

Brown rot is caused by the fungi *Monilinia fruticola* and *M. laxa.* They infect blossoms, fruits, twigs, and small branches. Some type of wound or insect injury is necessary for the infection to set in. In warm, damp conditions, the fruit quickly turns light brown, then develops tan to gray spore tufts, which give the fruit a fuzzy appearance. The rotted fruit eventually shrinks and blackens, taking on a mummified appearance. These mummies may stay attached to the tree. Brown rot is not known to cause leaf infection. However, it may infect flowers, resulting in wilting and the production of the same spore tufts as seen on the fruit. If the fungus invades stems, cankers result. Often the cankers ooze gum or sap. Injuries and insect activity may also cause prodution of this gum or sap on many stone fruit trees.

The most significant control measure is reduction of inoculum. Remove mummified fruit and prune out infected twigs or cankers. The fungus will continue to develop on unpicked fruit throughout the season, so remove mummified fruit as it appears. Also remove all fallen ripe fruit during the season—don't wait until autumn. Insect control is also essential because insects make the wounds that are necessary for infection. Commercial fruit growers generally use fungicides during bloom and three weeks before harvest to help control brown rot. For next year's reference, bloom sprays should be applied when the blossoms first appear and again four or five days later at full bloom. Some control can still be attained this year by spraying two to three weeks before harvest and repeating at seven-to-ten-day intervals. Many fungicides will work, but Captan is probably the easiest for homeowners to obtain and is the least expensive. Read the label carefully and honor preharvest intervals (the number of days before harvest that you can spray a particular chemical). Brown rot is discussed in detail in *Report on Plant Diseases* No. 804. *(Nancy Pataky)*

Black Root Rot of Strawberry

The black root rot complex of strawberry is caused by a number of fungal pathogens that invade when plants are grown in tight clay or poorly drained soils. These sites become particularly easy to detect in a rainy year. The disease also can be initiated by other environmental stress, such as freezing. The winter of 1996–97 provided a couple of freeze/thaw cycles. Spring 1997 has been rainy in many parts of Illinois, and the wet weather has been spotty over the summer. These conditions have been conducive to black root rot development.

Strawberry plants with black root rot exhibit a lack of vigor and productivity. When roots are washed of soil, they show many black, rotted roots with only a few white feeder roots. This disease cannot be identified any more certainly in the lab than in the field. Isolations from the roots would provide several fungal pathogens, none of which could be identified as the sole cause of this decline. Many fungi have been implicated in this disease complex, but treating the fungi does not alleviate the problem. As long as the site stress is present, the problem will continue.

If you have strawberries that have declined each year, including dead plants with roots as described above, consider establishing a strawberry bed in a new site. Make certain that the soil is loose in the new site and that drainage is away from the root zone. Plantings on clay sites or in low spots in the field or garden will cause chronic problems with strawberries. *(Nancy Pataky)*

Blossom-End Rot and Sunscald

Maturing tomato fruit sometimes develop large dead areas on the surface. The two most common causes of these lesions are blossom-end rot and sunscald. Pepper, summer squash, and other cucurbit crops may also show this problem.

Blossom-end rot develops as necrotic areas at the blossom end of the fruit. Tomato fruit tips turn brown to black, while the ends on peppers usually become light brown or tan. Blossom-end rot results from a calcium deficiency in the plant caused by large fluctuations in soil moisture. When soil moisture is limited, plant growth slows and nutrient uptake by the roots is reduced. If water becomes available again, from rain or irrigation, the plant begins to grow rapidly, but the uptake of calcium lags behind. Thus, the rapidly expanding fruit tip does not have enough calcium available to develop properly, even though there is plenty of calcium in the soil.

Foliar applications of a calcium-rich fertilizer to control blossom-end rot have varying rates of success. Certain studies indicate that some control is achieved with the fertilizer, while other studies report little or no reduction in the disease. The best method for controlling blossom-end rot is to maintain even and adequate levels of soil moisture. With soil that becomes neither too dry nor too wet, the plants grow at an even rate and the nutrients stay in balance. Of course, this goal is not easy to accomplish.

Sunscald also causes large necrotic areas on tomato and pepper fruit. Sunscald develops when an area on the fruit surface becomes too hot from sun exposure. On tomatoes and some peppers, therefore, sunscald often develops on the sides or "shoulders" of the fruit, near the stem end. Sunscald often develops on fruit that forms in the shade of the plant canopy but which is suddenly exposed to direct sunlight. Sunscald often occurs when plants lose leaves from foliar diseases. On tomatoes, early blight and Septoria leaf blight can cause premature defoliation, which leads to sunscald. On peppers, the defoliation occurs when plants infected with bacterial spot drop their leaves. Vascular wilt diseases and bacterial canker can also cause defoliation and, thus, lead to sunscald.

Avoid sunscald by controlling diseases that cause premature defoliation. Grow tomato varieties that are resistant to Verticillium and Fusarium wilts. Plant pepper varieties producing fruit that hang down and are covered by foliage. Minimize plant breakage during harvesting to avoid suddenly exposing the fruit to sunlight. *(Nancy Pataky)*

Home, Yard and Garden Pest Newsletter *is prepared by Extension specialists from the University of Illinois at Urbana-Champaign and the Illinois Natural History Survey. Information for this newsletter is gathered with the help of staff members, Extension field staff, and others in cooperation with the USDA Animal and Health Inspection Service.*

Major authors are Phil Nixon, (217) 333-6650, John Lloyd, (217) 333-6653, and Fredric Miller, (708) 352-0109, entomologists; Nancy Pataky, plant pathologist, (217) 333-0519; Rhonda Ferree, Tom Voigt, and David Williams, horticulturists, (217) 333-0350, and Karel Jacobs, plant pathologist, the Morton Arboretum, (630) 719-5646. Phil Nixon is the executive editor of the Home, Yard and Garden Pest Newsletter. *This newsletter is written by faculty in the Department of Natural Resources and Environmental Sciences and the Department of Crop Sciences. The newsletter is edited by Peggy Currid, typeset by Oneda VanDyke, and proofread by Herbert Morgan, all of Information Services.*

COOPERATIVE EXTENSION SERVICE

HOME, YARD & GARDEN PEST NEWSLETTER

college of agricultural, consumer and environmental sciences, university of illinois at urbana-champaign ▲ illinois natural history survey, champaign

No. 16 • August 6, 1997

This newsletter is issued weekly (biweekly in the early spring and late summer) to provide timely information on insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

PLANT DISEASES

Diagnosing Tree Root Problems

Tree decline may be caused by any number of below-ground stresses—drought, floods, compaction of the root zone, poor soil, planting too deeply, or inadequate space for roots, to name just a few. Often the process of diagnosing such a problem is one of eliminating possibilities that might cause similar symptoms. One of the most difficult possibilities to eliminate is root rot; many gardeners believe that they cannot possibly know about the health of a mature tree's roots.

The first sign of any root problem is top decline. Look for a few clues to determine whether a tree is growing well. You can see a tree's annual growth by looking at the trunk cross-section. (Most of us have done this as children. We counted the number of rings to tell us how old a tree was when it died and looked at the thickness of these rings to compare relative growth between years.) A less destructive way to determine amount of growth is to look at the stems. Follow the stem tip back to the first set of closely aligned rings (about 1/8 inch apart) around the stem—that is one year's growth. Continue down the stem to the next set of rings for the next year's growth. Most twigs grow from six to eighteen inches in one year. Of course, this amount varies by species and how much sun is received by the part of the tree you are examining. If the twig has grown only one inch for the last two years but grew eight inches three years ago, it is safe to assume the tree is under stress and that the stress began two years ago. Cankers on the stems, stem tip dieback, off-color foliage, early fall color, and early defoliation are also clues that a tree may be stressed by underground causes.

To detect the pathogenic wood rots and root rots, look for mushroomlike fungi growing at the base of the tree or shrub. With wood-rot fungi, the conks (also called "shelf fungi" or "fruiting bodies") may be found growing on the trunk or main branches. These are signs of the pathogen. The actual mycelia of the fungus is probably growing in or on the roots or internally in the wood. One of the most common types of rot is Ganoderma root rot, which produces a shelf type of fungal structure at the base of trees, especially honey locust. The structure is reddish brown and appears varnished. Its presence indicates that a root rot has invaded. Other fungi may indicate wood rots. Wet weather often triggers the formation of these conks, which are easily confused with fungi growing on dead organic debris near a tree. If, however, they are growing from the tree itself, suspect wood rot or root rot.

You can also carefully dig in the root zone of a tree to try to determine the health of the roots. Do this near the dripline in two or three spots. Healthy roots will be brown on the outside but will be white internally or at the very tips of the roots. If the roots have a soft, brown outer layer that easily pulls off the center of the root, then a root rot may be involved.

Some experts say that the presence of conks on a tree or rot in the root system means that a tree will soon die. That may be the case, but trees and shrubs may survive for many years with wood or root rots.

Do not remove a tree simply because it has a conk. Instead, consider the presence of conks as a diagnostic tool in determining the true problem with the tree. If, however, the tree appears to be a threat to life or property because of potential to fall or blow over, remove it as soon as possible.

ACES College of Agricultural, Consumer and Environmental Sciences, University of Illinois at Urbana-Champaign

CES Helping You Put Knowledge to Work—State • County • Local Groups
U.S. Department of Agriculture Cooperating
The Cooperative Extension Service provides equal opportunities in programs and employment.

A tree in decline cannot be helped with chemicals, but wood and root rot do not necessarily doom a tree. Use approved cultural practices to improve tree vitality, including weekly waterings of one to two inches of water in periods of extended drought. Also, cut out dead branches in the dormant season, fertilize in late fall or early spring, and keep traffic off the root system. These measures may help the tree continue to live for many years. For very old or very large trees, though, fertilization and watering may have no benefit. *(Nancy Pataky)*

Rhizoctonia Root Rot of Flowers

This fungal disease can cause damping-off of seedlings, a firm basal rot of cuttings, or root rot of more mature plants. Infection is favored by an intermediate moisture range and warm-to-hot temperatures, so we see this disease every year. Because *Rhizoctonia* fungi are found in most soils and can survive for many years on debris or as sclerotia (resting structures), the disease has the potential to infect many plantings.

Look for plants that are stunted, are low in vigor, or wilt easily on a warm day. The foliage may turn yellow to brown and may fall from the plant. In many cases, the lower leaves fall first and leaf drop progresses up the stem. There will not be any streaking of the vascular tissue. Carefully dig the plant and wash the roots and stems, looking for the signs of rotting or decay. Rhizoctonia usually causes a dry rot of roots and stems with a reddish brown color. The stem may have distinct dead, sunken areas (still dry) that partially or totally girdle the stem. You can distinguish this root rot from either Pythium or Phytophthora because those diseases cause a soft, black rot.

Many cultural practices will help prevent the root rot problems. Start with only top-quality seed or transplants. Plant in fertile, light, well-drained soil. If you are using containers, be certain that they are clean and that initial plantings occur in sterile soil mixes. When possible, avoid overwatering. Rotate annual planting beds with unrelated plants for several years to help reduce fungal buildup in the soil. Rhizoctonia root rot is a particular problem on impatiens. Because this is such a popular shade plant, growers rarely rotate out of impatiens until forced to do so by this disease. Some researchers suggest adding composted hardwood bark as a growing medium or mulch to help suppress root rotting fungi. Other control measures and discussions of the major root rot fungi, disease cycles, and related topics may be found in *Report on Plant Diseases* No. 615, Damping-off and Root Rot of House Plants and Garden Flowers.

Chemicals are used as preventive controls and must be applied before symptoms are evident. Chemicals may also be used to protect healthy plants once the disease is spotted in a planting. Current recommendations are listed by host in the *1997 Illinois Commercial Landscape and Turfgrass Pest Management Handbook. (Nancy Pataky).*

Peony Leaf Disease

Red spot, leaf blotch, and measles are names for the same fungal disease that affects all above-ground parts of peony. The disease occurs to some extent every year and is caused by *Cladosporium paeoniae*. It is most serious in large plantings in which plants are dense and grown closely together and when the old tops are not destroyed in late autumn or early spring.

Small, circular, red or purple spots appear on the upper surface of young leaves just before the peony blooms. Later, the spots appear on the underleaf surface. The lower sides on infected leaves soon turn dull chestnut brown, while the upper surfaces are glossy, dark purple. As the host tissues mature, the lesions enlarge rapidly and may form large, irregular, unsightly blotches. Stem and petiole lesions are short, reddish brown streaks at first. Later, the lesions on stems near the soil line become somewhat sunken or pitted and tend to merge and darken. Spots on all plant parts remain purplish or brownish red throughout the season.

Nothing can be done to help this year's plants. To control the problem next year, remove all old tops to ground level and destroy, bury, or remove them from the garden. Do this in the fall or next spring before new growth starts. Mark your calendar now so you won't forget about this task.

Just before the shoots break through the soil surface in the spring, spray the soil around the plants with mancozeb or maneb. Be sure to soak the soil surface area, stem stubs, and any remaining peony debris. Spray the plants weekly during cool, damp, overcast weather, starting when the new shoots are two to four inches tall and continuing until the flowers begin to open. The addition of a spreader-sticker will help coverage. For more information on this disease, consult *Report on Plant Diseases* No. 631. *(Nancy Pataky)*

INSECTS

Fall Webworm

Fall webworms are numerous throughout Illinois. Their numbers are also high in other areas of the Midwest, with large populations noticed by the authors while on vacations in central Missouri and southwestern Michigan. In the southern half of Illinois, this infestation represents the second generation, while in the northern half of Illinois, the first and only generation is present.

Fall webworm larvae appear as two races. The red-headed race has a red head and yellow, hairy body with few or no black spots. The black-headed race has a black head and many black spots on a yellow, hairy body, with a blackish stripe running down the back. Both races feed as colonies of 50 to more than 100 caterpillars on leaves enclosed in a silk tent constructed by the caterpillars.

Young caterpillars cause damage by feeding on the leaf undersides, eating away the lower epidermis and mesophyll, leaving the upper epidermis intact. This "window-feeding" damage causes the leaf to turn brown. Older caterpillars eat the entire leaf blade except for the major veins, a type of damage called "skeletonizing." As the caterpillars eat all of the leaves within the silk tent, they enlarge it to include more leaves. Many tree species are attacked but crabapple, maple, hickory, and walnut are the most common.

Leaf loss at this time of year causes little damage physiologically to the tree. Leaves are most productive early in their lives when they are still somewhat soft and pliable. Much of this summer's production for the tree has already been achieved, and leaves that are eaten now will usually not be replaced by the tree.

Aesthetic damage due to leaf loss and large webs is as great at this time of year as any other. Small, young colonies can be pruned out or the caterpillars can be physically stripped from the leaves. Many insecticides are effective against fall webworm caterpillars, including *Bacillus thuringiensis* var. *kurstaki* (Dipel, Thuricide). Because fine spray will not penetrate the silk tents, use high-pressure applicators or stick the spray nozzle inside the tent. *(Phil Nixon and John Lloyd)*

Beetles

Japanese beetles continue to be present and feeding on rose, crabapple, linden, birch, and many other trees and shrubs. Numbers appear to be lower this year throughout the state, reducing the need for frequent insecticide applications. These beetles will be present until the third week of August.

Strawberry root weevil adults are present throughout the state. These 1/4-inch-long, hard-shelled brownish to blackish beetles have a head that extends into a broad muzzle. Their larvae feed on the roots of a wide range of ornamental shrubs, both deciduous and evergreen. The adults eat out notches on the leaf margins of rose, sunflower, daisy, and many other flowers. They also migrate indoors to feed on houseplants. Various pyrethroid insecticides are labeled for indoor use to protect houseplants. Any weevils seen rambling around the house should be removed by hand or vacuum. If houseplants are not present, the insects will not feed and will leave the house next spring. Attacked outdoor plants can be protected with carbaryl (Sevin), diazinon, methoxychlor, acephate (Orthene), bifenthrin (Talstar), cyfluthrin (Tempo), and other insecticides.

Annual **white grub** larvae should be scouted in untreated, irrigated turf in the first week of August in southern Illinois and during the second week of August in the rest of the state. Cutting through the sod and pulling it back will reveal the feeding larvae. Ten or more larvae per square foot will cause damage, but five or more per square foot will attract raccoons, skunks, and birds to feed on them. These animals can cause more damage by tearing up turf than the grubs do by their feeding. Many insecticides will provide control, including trichlorfon (Dylox, Proxol), bendiocarb (Turcam, Intercept), and diazinon. *(Phil Nixon)*

Borers, Borers, Borers

"My tree died and it has all sorts of holes in it. What killed my tree?" Performing a "phone autopsy" on a tree (diagnosing the cause of death over the phone) is a difficult task for any entomologist or plant pathologist. Inevitably the answer is "Send in a sample and we'll try to figure it out." When we receive a sample, we try to look for specific indicators to provide some insight.

When diagnosing borer-induced plant decline, we look for such signs as the pitch mass between the branch whorls that is associated with pitch mass borer on pines, or the sap, sawdust, and frass pushed out of the holes at the base of the trunk by many of the clearwinged moth borers on deciduous plants. In some cases, diagnosis is elementary. If holes are in rows, are about the diameter of a pencil, and appear to go through only the bark of the tree, it's most likely yellow-bellied sapsucker damage (birds can make rows but insects can't.) Unfortunately, most borer problems are not that easy to diagnose.

For Zimmerman pine moth, the damage usually does not become too obvious until wind rips off the leader of the infested conifer. Trees attacked by Zimmerman pine moth will survive but will lose their central leader. Consequently, they will no longer look like Christmas trees, but will have what we in pest management call "character."

For most of the flatheaded borers, such as bronze birch borer and flatheaded appletree borer, we don't start looking for signs until the symptoms of decline set in. Once the decline starts, it is usually possible to detect the winding callus tissue created by the tree to cover the damage created by the larvae burrowing through the cambial layers of the tree. Also easy to spot are D-shaped exit holes created by emerging adult beetles. When shotgun holes are apparent in any tree with decline, the list of potential suspects narrows to bark beetles.

If we find insect damage, does that mean that the insects are responsible for the decline and death of the tree? Yes and no. Trees that have died and have holes in them may actually be infested with insects that are feeding on the dead wood. Not all borers prefer live trees. Many of the borers, especially bark beetles, are simply the final straw in a series of problems for a tree.

The majority of trees attacked by borers are susceptible to attack because of other problems in their environment. Several years of drought or flooding will stress trees to the point of becoming borer fodder. Improper tree selection, planting, and maintenance can also stress trees and make them more susceptible to borers. Wounds from string-trimmers or lawn mowers provide avenues for the borers to enter the trees.

So we get back to the original question: Who or what killed the tree? Ruling out borers and environmental stresses often reveals the real cause: unintentional damage or neglect from humans. *(John Lloyd)*

Home, Yard and Garden Pest Newsletter *is prepared by Extension specialists from the University of Illinois at Urbana-Champaign and the Illinois Natural History Survey. Information for this newsletter is gathered with the help of staff members, Extension field staff, and others in cooperation with the USDA Animal and Health Inspection Service.*

Major authors are Phil Nixon, (217) 333-6650, John Lloyd, (217) 333-6653, and Fredric Miller, (708) 352-0109, entomologists; Nancy Pataky, plant pathologist, (217) 333-0519; Rhonda Ferree, Tom Voigt, and David Williams, horticulturists, (217) 333-0350, and Karel Jacobs, plant pathologist, the Morton Arboretum, (630) 719-5646. Phil Nixon is the executive editor of the Home, Yard and Garden Pest Newsletter. *This newsletter is written by faculty in the Department of Natural Resources and Environmental Sciences and the Department of Crop Sciences. The newsletter is edited by Peggy Currid, typeset by Oneda VanDyke, and proofread by Herbert Morgan, all of Information Services.*

COOPERATIVE EXTENSION SERVICE

HOME, YARD & GARDEN PEST NEWSLETTER

college of agricultural, consumer and environmental sciences, university of illinois at urbana-champaign ▲ illinois natural history survey, champaign

No. 17 • August 20, 1997

This newsletter is issued weekly (biweekly in the early spring and late summer) to provide timely information on insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

Biweekly Issues

This is the first of the late-season biweekly issues of *Home, Yard and Garden Pest Newsletter.* Three more biweekly issues will take us through the end of September. We will publish an issue in late October and a final issue with an index for the entire year in late November. *(Phil Nixon)*

HORTICULTURE

Water Your Landscape Plants

The rapid onset of unhealthy-looking landscape plants is cause for concern. Many landscape plants in Illinois are suffering from extremely dry weather. Symptoms include severe leaf wilt, yellow leaves, early fall coloring, and leaf scorch (browning along the margins) on broadleaf plants, and brown, dying turfgrass.

The symptoms are a result of the roots failing to supply sufficient water to the leaves. This inability is influenced by the moisture content of the soil and by the location and condition of the root system. The drought conditions have significantly reduced some plant root systems, making them unable to supply enough water to compensate for the tremendous amount lost through the leaves.

As would be expected, some plants are affected more by drought conditions than others. Especially affected are potentilla, hydrangea, viburnum, euonymus, and holly shrubs; redbud trees; spruce and hemlock conifers; and bog plants such as iris and astilbe. Fortunately, our native prairie species adapt well to these conditions and, although the top growth is dying back, this dieback helps build reserves into the crown for growth next season.

Knowledge of plants' normal growth habits is important. For example, although many white pines continue to show signs of stress (see "White Pine Problem" in issue No. 12 of this newsletter), these pines naturally drop last year's needles in late August through mid-October. By contrast, most other pines and spruces keep several years of needles. If they begin to drop last year's needles, severe stress or disease could be present.

To save the landscape plants, water any stressed plants now to encourage recovery growth and root revival. Apply enough water to penetrate deeply within the dripline. Newly installed plants, especially those in containers, should be watched carefully and watered properly. Never overwater. To prevent plants from sending out succulent, frost-susceptible growth, avoid fertilizing or pruning until plants are dropping their fall leaves. *(Rhonda Ferree and Floyd Giles)*

INSECTS

Annual White Grubs

Although all indications are that larval annual white grubs should be present now in large numbers, we have yet to find any in central Illinois or in any other part of the state.

The adult beetles emerged later than usual, probably because of the cool spring. We normally first see adults in east central Illinois on the evenings of July 2 or 3, but we did not see them until July 7, almost one week later. July 18 was the last time that we saw beetles in central Illinois.

Because the beetles do not feed, they normally live for only about two weeks. At the Morton Arboretum in northeastern Illinois, annual white grub adult flight

ACES College of Agricultural, Consumer and Environmental Sciences, University of Illinois at Urbana-Champaign

Helping You Put Knowledge to Work—State • County • Local Groups
U.S. Department of Agriculture Cooperating
The Cooperative Extension Service provides equal opportunities in programs and employment.

peaked on July 22, and a few were still present in the first week of August. In most years, annual white grub flight is over in northern Illinois near July 25. Beetle flights ranged from normal in some areas of the state to above average in many areas, including central Illinois.

When turf is dry and dormant, the adults migrate to irrigated turf to lay their eggs. Unirrigated turf throughout most of Illinois was dry and dormant in July. This should have resulted in large numbers of eggs being laid in watered turf.

The eggs that the masked chafers or annual white grub adults lay usually hatch in two to three weeks. High soil temperatures —around 90°F and above— will reduce hatching. However, soil temperatures have been in the 70s during this time. The resulting white, C-shaped grubs are easily noticed against dark soil, even the newly hatched ones, which are approximately 3/16 inch long. They are present in the root zone of turf if the soil is damp. Dry soil will cause the grubs to move downward in the soil column.

With the late flight of the beetles, we do not anticipate damage to occur until late August in southern Illinois and until almost mid-September in northern Illinois. Grub numbers of ten or more per square foot are likely to cause turf damage.

If raccoons, skunks, or birds feed in the area, turf damage will occur at much lower numbers—three to five grubs per square foot. Raccoons peel back four- to twelve-inch-wide sections of turf to feed on the grubs. Skunks tear out divots of turf that are three to six inches in diameter. While a raccoon usually tears out six or fewer sections of turf in an area, a skunk usually makes 30 or more holes. Birds pick at the turf, tearing out the sod in one-inch pieces. Such feeding causes the affected areas to turn brown from the removed thatch and sod.

If treatment for grubs is needed at this time, use faster-acting insecticides such as trichlorfon (Dylox, Proxol), bendiocarb (Turcam, Intercept), or isozofos. Triumph is labeled for use only on home lawns, sod farms, and golf course tees, greens, and aprons. Diazinon is not labeled for use on golf courses or sod farms. Grubs treated with diazinon will stop feeding but will take about three weeks to die. (*Phil Nixon, Fredric Miller, and Karel Jacobs*)

Bagworms

Bagworms were late hatching this year, which resulted in a later feeding season than normal. Usually bagworms pupate in mid- to late August, but we are still hearing reports of feeding bagworms around the state and recently saw some in central Illinois that were only 3/4 inch long. Bagworms usually pupate when they are about 1-1/2 inches long.

Bagworms are whitish caterpillars that construct individual silk cases around themselves. They cover these silk cases with bits of leaves from the tree or shrub they are feeding on. These bits of foliage turn brown within a couple of days, resulting in brown bags moving across the trees and eating leaves.

Throughout its entire life as a caterpillar, this insect places new foliage at the top of the bag. Thus, an actively feeding caterpillar has green foliage at the top of its bag. If the caterpillar pupates, it ties off the top of the bag to a branch, and any green foliage quickly turns brown. If the caterpillar dies, the foliage on the bag will be completely brown. Bagworms that are alive and actively feeding can be controlled with trichlorfon (Proxol, Dylox), cyfluthrin (Tempo), and other synthetic pyrethroids. *Bacillus thuringiensis* var. *kurstaki* (Dipel, Thuricide) is more spotty in its control of large larvae but is the only option for do-it-yourself homeowners.

Bagworms start to feed at the top of the tree and work their way down. A pair of binoculars is useful for detecting feeding bagworms on large trees. Bagworms most commonly attack eastern red cedar and other junipers, as well as spruces, arborvitae, Douglas-fir, honey locust, pin oak, red oak, and tallhedge. Stripped branches of coniferous evergreens will probably die.

Bagworms will pupate later this summer. Male bagworms emerge as black, one-inch-long moths with clear wings. They mate in early fall with the adult females that stay in the bag. Adult female bagworms are brownish and larval in appearance. Mated females fill their bodies with up to 1,000 eggs in the fall before they die. These eggs hatch in June of the following year.

Old bags that housed males will have dark brown pupal cases (about 1/2 inch long) sticking out of the end. The other bags are likely female bags that can be picked off trees from late fall through spring to reduce the number of caterpillars that are present next year. Do not just toss the picked bags to the ground under the tree because young bagworm larvae crawl long distances and will probably crawl up onto the tree. Picking off all of the old bags will not totally eliminate bagworms from the tree because young bagworm larvae are blown on strands of silk from tree to tree for a couple weeks after they hatch in June. *(Phil Nixon)*

PLANT DISEASES

Bacterial Wilt of Cucurbits

This disease is caused by a pathogen so small that hundreds can be found in bacterial exudate the size of a drop of water. The pathogen can quickly multiply and plug the vascular tissues so that water transport does not occur. This tiny bacterium is transported from plant to plant by both striped and spotted cucumber beetles.

Bacterial wilt is most devastating on cucumbers and muskmelons (cantaloupes). The disease can also occur on pumpkins and squash, although not often as severely. It rarely infects watermelon. In all cases, wilt symptoms appear first on individual leaves and quickly spread to lateral shoots, causing the entire plant to wilt. Symptoms develop more quickly on younger, smaller plants.

To confirm the presence of bacterial wilt, cut a live, wilted runner off the plant. (Take the five or six inches of stem nearest the crown.) Cut the stem section in two, then hold the cut ends back together and squeeze them until the plant sap flows out and intermingles from each cut edge. Slowly pull the cut ends apart. If there is a strand of sticky sap between the cut ends, then a bacterium is likely present and bacterial wilt is a strong possibility. Unfortunately, once you confirm this disease, nothing can stop it in the infected plant. However, steps can be taken to prevent the wilt in next year's plants.

The primary method for controlling bacterial wilt is to control the beetle vector. The beetles overwinter as adults that are present when the vine crops emerge. The application of both preplant systemic and postemergence protectant insecticides might be necessary to prevent a problem with bacterial wilt in commercial plantings. Because the beetles are most attracted to plants in the cotyledon stage, insecticides should be initiated immediately after planting. Entomologists warn that when blossoming begins, insecticides should be applied late in the day so as not to interfere with pollination by bees. Consult *Report on Plant Diseases* No. 905 for details about bacterial wilt. *(Nancy Pataky)*

Watch for Pine Wilt

Pine wilt, caused by the pinewood nematode, was discussed in issue No. 8 of *Home, Yard and Garden Pest Newsletter.* We have confirmed several cases of pine wilt at the Plant Clinic in the last two weeks, so it is appropriate to review the symptoms of this disease. Trees dying now were likely infected in spring or summer.

Watch for the appearance of entire dead branches or sudden decline and death of an entire pine within a few weeks or months of initial symptoms. Be particularly suspicious of 15- to 20-year-old Scotch pines with these symptoms. Austrian pine is the only species that may show tip dieback as the first symptom. For symptoms on white pine, see issue No. 12 of this newsletter. (Although we have assayed many white pines for pinewood nematodes, we have never confirmed the pinewood nematode in that species.)

Sawyer beetles vector the nematode from pine to pine. Because there is no easy way to stop the beetle and because no treatments exist for infected trees, early detection is critical to disease control. To break the disease cycle, quick removal of an infected tree is important. Consult *Report on Plant Diseases* No. 1104 for details about pine wilt. *(Nancy Pataky)*

Guignardia Leaf Blotch

Horsechestnut and buckeye trees that appear from a distance to be severely scorched may actually be infected with this fungal disease. On closer inspection, reddish brown leaf spots with bright yellow margins are obvious. The spots will enlarge and cover most of the leaf surface. Leaves then become dry and brittle and drop early. You can distinguish this disease from environmental scorch by the presence of fruiting bodies formed by the fungus (*Guignardia aesculi*) in the leaf lesions in moist weather. These black, pinhead-sized structures are called pycnidia. With Guignardia leaf blotch, all leaves will be affected, unlike with scorch, which first affects newest leaves on the sun or wind side of the tree.

This disease is serious yet treatable in nursery stock. Mature trees usually retain live buds and lose leaves late in the season, so they are not significantly harmed. Removing fallen leaves may be helpful in reducing the amount of fungal inoculum living through the winter on these leaves. Also try to prune surrounding vegetation to allow better airflow through the area for more rapid drying of foliage. *(Nancy Pataky)*

Rhizoctonia Brown Patch

Brown patch is a fungal disease caused by *Rhizoctonia* species. It commonly occurs in hot, muggy weather when night temperatures are at least 70°F and daytime temperatures are in the 80s and 90s. It is favored by heavy rains or watering and by grass that is dense and at least adequately fertilized.

The disease appears as patches up to two or three feet wide. The patches may be dark blue initially, as though under drought stress. The color quickly changes to purple-brown and then light brown. The patches may develop green centers and resemble summer patch or necrotic ring spot. In light infections, the turf generally recovers in two or three weeks. When the attack is severe, the crowns, rhizomes, stolons, and roots may turn brown and rot, causing turf to be thinned or killed in large areas.

A few cases of brown patch have been confirmed at the Plant Clinic. Many similar cases have been caused by drought, not a pathogen.

Brown patch can be prevented with the cultural practices listed in *Report on Plant Diseases* No. 411. Once the disease occurs, chemicals may keep it from spreading, but long-term control requires following cultural recommendations. Chemical options are listed in the *1997 Illinois Commercial Turf and Landscape Pest Management Handbook*. Be sure to read the label on the selected product for recommended formulation, rates, and timing for your particular turf conditions. Because such applications usually require sprays at five- to fourteen-day intervals throughout the summer, fungicide control of brown patch is usually reserved for golf courses. Products are not always available in quantities suitable for homeowner use. The recommendation for a severe infection in a home lawn is to rake and remove the dead areas, follow cultural recommendations, and re-seed with a blend of resistant turf grasses suitable for the light requirements of the lawn. *(Nancy Pataky)*

Home, Yard and Garden Pest Newsletter *is prepared by Extension specialists from the University of Illinois at Urbana-Champaign and the Illinois Natural History Survey. Information for this newsletter is gathered with the help of staff members, Extension field staff, and others in cooperation with the USDA Animal and Health Inspection Service.*

Major authors are Phil Nixon, (217) 333-6650, John Lloyd, (217) 333-6653, and Fredric Miller, (708) 352-0109, entomologists; Nancy Pataky, plant pathologist, (217) 333-0519; Rhonda Ferree, Tom Voigt, and David Williams, horticulturists, (217) 333-0350, and Karel Jacobs, plant pathologist, the Morton Arboretum, (630) 719-5646. Phil Nixon is the executive editor of the Home, Yard and Garden Pest Newsletter. *This newsletter is written by faculty in the Department of Natural Resources and Environmental Sciences and the Department of Crop Sciences. The newsletter is edited by Peggy Currid and typeset by Oneda VanDyke of Information Technology and Communication Services.*

COOPERATIVE EXTENSION SERVICE

HOME, YARD & GARDEN PEST NEWSLETTER

college of agricultural, consumer and environmental sciences, university of illinois at urbana-champaign ▲ illinois natural history survey, champaign

No. 18 • September 3, 1997

This newsletter is issued weekly (biweekly in the early spring and late summer) to provide timely information on insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

PLANT DISEASES

Plant Clinic Closing

The Plant Clinic will close for the season at 5:00 p.m., Friday, September 12, 1997. It will reopen May 1, 1998.

Any samples received at the clinic by September 12 will be processed. Anything received after that date will not be processed. There is no funding to staff the clinic in the winter months, so diagnosis will be handled through local Cooperative Extension offices without the aid of a lab. In most cases, the lab is not needed in the winter months.

Diagnostic staff becomes a skeleton crew after September 12, and it takes until the end of the month to finish all samples still in culture or requiring extra attention. In the past we have tried to continue to handle samples later in the season as time allows, but this coming October is already booked with meetings, prep time, and publication deadlines. The lack of time available often causes feelings of ill will in clients who do not understand that we are trying to fit them in as time allows. This also causes much anxiety for staff as we try to please everyone. To eliminate these uncomfortable situations, the staff at the Plant Clinic will not be handling any new samples after this season's closing date.

After the closing date, if you have a plant problem, your first step should be to contact your local Cooperative Extension office. If it is then determined that you need help from a specialist, the following contacts may be helpful. Do not send samples to a specialist unless you have first spoken to him or her and established that a sample is required. *(Nancy Pataky)*

Insect problems	Phil Nixon: 333-6650
Disease problems	Nancy Pataky: 333-2478
Tree and shrub care	Dave Williams: 333-2126
	Floyd Giles: 333-2125
Turf care	Tom Voigt: 333-7847
Herbaceous plant problems	Jim Schmidt: 244-5153
Vegetable questions	Chuck Voigt: 333-1969

Cankers of Trees and Shrubs

A canker is a dead area of the vascular tissue and surrounding wood of a tree or shrub. You might also find cankers on herbaceous plant material, usually as sunken, dead areas on the stems. The term "canker" is a general term that refers to a symptom on the plant. Cankers may be caused by injuries (such as from hail or mowers), environmental stress (cold, heat, scald, etc.), chemicals, or pathogens. Cankers are common on a wide range of trees and shrubs, which is the topic of concern here. Typically, cankers occur on trunks, older branches, and injured areas on smaller twigs.

The newest tissue is usually the first to show decline. Leaves begin to wilt, then turn yellow, and finally brown. Some young twigs may curl downward. Bark on younger twigs may lose color or blacken, depending on the canker or plant involved. (For example, fire blight cankers are often black on pear but brown on apple.) If a canker girdles the stem, the twig will die back to the canker. If the stem is not girdled, it may show one-sided death, or some leaves will be affected while others are green. Cankers usually take months, or sometimes years, to enlarge enough to girdle twigs, branches, and trunks. Cankers can appear swollen, sunken, cracked, or discolored. They may also bleed sap or moisture.

ACES College of Agricultural, Consumer and Environmental Sciences, University of Illinois at Urbana-Champaign

Helping You Put Knowledge to Work—State • County • Local Groups
U.S. Department of Agriculture Cooperating
The Cooperative Extension Service provides equal opportunities in programs and employment.

Fungi are usually the cause of cankers on stressed plants, but occasionally we find a bacterial canker. The fungal cankers often contain fruiting bodies of the fungus. The fruiting bodies are pinhead-sized black specks embedded in the bark. Often these fruiting bodies will appear as small bumps all over the cankered area. In wet weather, they may exude colorful spore tendrils.

Most canker pathogens enter through an injury from sunscald (summer or winter) or through an injury caused by insects, animals, diseases, pruning, or mechanical and chemical sources. Weakened tissue caused by poor growing conditions, transplant shock, excess or deficient soil moisture, rapid temperature changes, nutritional imbalance, or extensive defoliation also provides entry points for the pathogen.

The likelihood of a tree having cankers can be reduced by choosing plants adaptable to local growing conditions. Buy vigorous, healthy-looking plants. Be sure to plant them at the proper depth, and space the plants based on mature size. Grow plants in well-drained, fertile soils with the optimum soil pH for growth. Simply put, avoid cankers by following the good horticultural practices that we have learned over the years.

When you notice a canker, try to determine why it is present. If you can address the cause, you stand the best chance of helping the tree. Next, determine whether you need to remove the cankered area. If it is on the trunk, you may opt to leave the area alone or remove as much of the decayed wood as possible so that the tree can more readily form a callus over the injured area. Prune out stem cankers if they are aesthetically unappealing or when it is obvious that they will soon girdle the stem. Some cankers, such as anthracnose on sycamore, cannot be removed without removing most branches. Leave these on the tree and take measures to promote tree health.

When pruning out cankers, keep in mind that the wood is infected with a pathogen. Remove the affected wood from the site. Disinfect pruners between cuts when possible. Always try to prune in dry weather to prevent pathogen spread. A report on cankers and dieback diseases of trees is available in *Report on Plant Diseases* No. 636. *(Nancy Pataky)*

Rose Cane Cankers

Three canker diseases (brown canker, stem or common canker, and brand canker) are common in Illinois and are generally confused with winter injury or other problems. Cane infections levels may approach 100 percent when control measures are not practiced.

You don't need to be able to distinguish among canker species, but it is important to know when a canker problem exists. The first symptoms are small, roundish lesions in the canes; the spots are pale yellow, reddish, or bluish purple. They gradually enlarge, turn brown or grayish white (often with a darker margin), and may partially or completely girdle the cane. Complete girdling results in dieback or poor growth of the plant parts above the affected areas.

Cankered areas are sprinkled with black, speck sized, fruiting bodies. When left unchecked, infections may spread downward into the crown, causing entire rose plants to wilt, wither, and die. Infection occurs chiefly through wounds, including thorn abrasions. Infections may also occur on the leaves and flowers.

Good sanitation is critical to control these diseases. Prune the canes in fall and early spring, according to the type and cultivar grown. Remove and burn or haul away all infected, dead, and weak parts of canes, as well as infected leaves, flowers, buds, and hips. When pruning cankerous stems, cut back to a strongly growing shoot or branch at least two or three inches below any sign of infection. Before each cut, dip the shears in a disinfectant such as 10 percent chlorine bleach or 70 percent rubbing alcohol. Use sharp tools to make clean, slanting cuts no more than 1/4 inch above a node.

Plant only top-quality, disease-free plants from a reputable nursery. The plants should be free of cane bruises or colored spots. Bargain roses are often infected. Maintain plants in high vigor by proper planting, spacing, fertilizing, watering, winter protection, and thorough spraying with fungicides. Start when the buds break open in the spring and continue at seven- to ten-day intervals into September or early October. The fungicides that control black spot usually control cankers as well, so no additional spraying is required. Adding a spreader-sticker material to the spray, however, helps wet the canes for better protection. Consult *Report on Plant Diseases* No. 626 for details concerning rose cankers. *(Nancy Pataky)*

INSECTS

The Invasion of the Gypsy Moth

It appears that we'll be hearing more and more about gypsy moth in Illinois over the next several years. According to Stan Smith at the Des Plaines office of

the Illinois Department of Agriculture (IDA), moth captures are much higher in 1997 in northern Illinois than they have been in the past.

Gypsy moth pheromone traps are used to catch male moths and identify areas for intensive searches for egg masses (Figure 1). The presence of egg masses indicates that a reproducing infestation of gypsy moth is in the area. Egg mass surveys help determine the areas that will be treated to control gypsy moth the following spring.

In addition to the male moths caught in the pheromone traps, IDA personnel noticed gypsy moth caterpillars near some trap locations, which suggests that a reproducing population now exists in the Chicago area. The areas of highest moth capture tend to be in Cook, McHenry, and DuPage counties, although moths have been trapped in counties on the border with Wisconsin across the state to the Mississippi River. Grundy, La Salle, and Kankakee counties are as far south as the moth has been found, so far.

Starting in November, the IDA will begin egg mass searches throughout the infested counties. IDA personnel will enter yards and inspect trees for the presence of any egg masses. Homeowners and landscapers can help in the investigation by reporting any suspected gypsy moth egg masses. (Egg masses are light tan to yellow and about one inch long.) Additionally, people who vacationed this fall in Wisconsin, Michigan, or other gypsy-moth-infested areas should examine their vehicles and other outdoor equipment for egg masses that may have been laid during their visit. If you suspect that you have found a gypsy moth egg mass, please call the Des Plaines office of the Illinois Department of Agriculture at (847) 294-4343.

Figure 1. Gypsy moth egg masses

According to Smith, because of the large numbers of moths captured this year in the northern tier of counties, trapping efforts in southern Illinois will be curtailed from the levels of past years. The IDA usually traps northern and southern Illinois during alternate years.

The IDA will continue with eradication efforts next year to try to contain this most recent invasion. Hopes are that with legislative support and potential support from programs (such as the U.S. Forest Service's "Slow the Spread" program), this severely defoliating pest will be restricted to northern Illinois for the next several years. *(John Lloyd)*

White Grubs

Annual white grubs continue to be difficult to find. We do have a report of numerous white grubs in turf in McHenry County in northern Illinois. They were found after raccoons had heavily damaged the turf while feeding on them. Elsewhere in the state, we have yet to see or hear of any white grub infestations, but it would be wise to remain vigilant.

Adult Japanese beetles are almost completely gone by now, but they had been present in fairly high numbers as recently as August 21 in central Illinois. Eggs laid by these old beetles may hatch as late as early September. In areas infested by Japanese beetles, late-hatching eggs combined with dry spells in September or October could result in turf damage where annual white grub numbers are near the damaging level (10 to 12 grubs per square foot).

Irrigation during dry spells in late summer through fall will allow turf with smaller numbers of white grubs to avoid dieback. With the help of watering, turf with limited root systems due to grub feeding will be able to stay green and healthy. Thus, a couple of well-timed irrigations can prevent the need for an insecticide treatment. *(Phil Nixon and Bruce Spangenberg, Extension Educator)*

Sod Webworm

Although much of the state has received ample rainfall in the last few weeks, some areas have not been as fortunate. In those drier areas, sod webworm may be a problem. Small sod webworm larvae in sufficient numbers to damage turf were found on August 25 in Lake County in extreme northeastern Illinois.

Sod webworm larvae are attacked and killed by microsporidia. These microorganisms are most effective during damp conditions. They are so effec-

tive in Illinois that we normally see sod webworm problems only during dry weather or in well-drained areas such as slopes and berms.

With a new generation of sod webworm larvae present, look for early damage, particularly in dry locations. Damage will first appear as indistinct areas of brownish turf. Close examination will show that many of the grass blades have been eaten off at the base. You may also see tiny balls of green caterpillar feces—about twice the size of a pinhead. Large numbers of starlings, cowbirds, red-winged blackbirds, or other blackbirds on the turf may also indicate the presence of sod webworms.

You can flush the caterpillars to the surface with a tablespoon of two percent pyrethrin insecticide or with a mixture of dishwashing detergent and water (one tablespoon detergent per gallon of water). Apply the treatment over a square foot of turf and look for brown-spotted, slender greenish or tannish caterpillars coming to the surface. Two to three larvae per square foot are enough to cause turf damage. *(Phil Nixon and Bruce Spangenberg, Extension Educator)*

Locust Borer

Black locust is attacked by several insects that can cause damage. The locust borer probably causes the most severe damage. Adult locust borers are present throughout Illinois. These one-inch-long beetles with long antennae are black with very obvious bright yellow straight and W-shaped bands on the back. They are commonly found on goldenrod and other late summer blossoms, feeding on pollen.

After emerging, adult locust borers mature, feed on pollen, mate, and then lay eggs in bark crevices and holes of black locust. The eggs hatch into larvae that tunnel through the bark into the phloem, where they feed and spend the winter. In June of the following year, they tunnel deeper into the heartwood of the tree. After about five inches of burrowing, they pupate in the burrow and emerge in late summer.

Locust borer infestation is identified by the coarse frass (feces) and wood shavings that are pushed out of the holes made by borers. Damaged areas will be swollen and appear as an enlarged area of the trunk. Emergence holes are round and about 1/3 inch in diameter. Heavily attacked trees will have branch dieback.

In many Illinois landscapes, the best way to manage the locust borer (and other pests) is to not plant black locust trees. Sprays of chlorpyrifos (Dursban) on the trunk will be effective now to prevent further larval attack. *(Phil Nixon and Bruce Spangenberg, Extension Educator)*

Ugly Nest Caterpillar

Ugly nest caterpillar makes a silk tent similar to fall webworm, but smaller. This caterpillar is common on cherry, hawthorn, rose, pyracantha, cotoneaster, and other rose family plants. The larvae are numerous within the webbed area, feeding on the leaves. They are rose green, light green, yellowish green, or lime green, depending on their age and host. Fully grown larvae are almost one inch long and have black heads. As the larvae become older, the silk tent fills with frass (feces) and bits of leaves; hence, the name "ugly nest caterpillar."

Adults emerge to lay masses of eggs on the host plant; these eggs overwinter and hatch the following spring. Because the season is so far along, treatment at this time is probably not necessary, but be watchful for the webbing next spring. This insect can be a particular problem in sheared hedges, causing sparse foliage and unattractive hedges. Ugly nest caterpillars commonly feed just under the sheared surface where branches are very twiggy, which makes identification of the problem more difficult. *(Phil Nixon)*

Home, Yard and Garden Pest Newsletter *is prepared by Extension specialists from the University of Illinois at Urbana-Champaign and the Illinois Natural History Survey. Information for this newsletter is gathered with the help of staff members, Extension field staff, and others in cooperation with the USDA Animal and Health Inspection Service.*

Major authors are Phil Nixon, (217) 333-6650, John Lloyd, (217) 333-6653, and Fredric Miller, (708) 352-0109, entomologists; Nancy Pataky, plant pathologist, (217) 333-0519; Rhonda Ferree, Tom Voigt, and David Williams, horticulturists, (217) 333-0350, and Karel Jacobs, plant pathologist, the Morton Arboretum, (630) 719-5646. Phil Nixon is the executive editor of the Home, Yard and Garden Pest Newsletter. *This newsletter is written by faculty in the Department of Natural Resources and Environmental Sciences and the Department of Crop Sciences.*

COOPERATIVE EXTENSION SERVICE

HOME, YARD & GARDEN PEST NEWSLETTER

college of agricultural, consumer and environmental sciences, university of illinois at urbana-champaign ▲ illinois natural history survey, champaign

No. 19 • September 17, 1997

This newsletter is issued weekly (biweekly in the early spring and late summer) to provide timely information on insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

INSECTS

auf Wiedersehen, Arrivederci, au Revoir ...

I'd like to take this opportunity to say farewell to the colleagues, clientele, and friends with whom I had the good fortune to work during the past five years at the University of Illinois. I truly enjoyed my time here and the opportunities to work with a variety of people involved with pest management in the urban environment.

By the time this sees print, I will be embarking on a new adventure in research and extension at the Ohio Agricultural and Development Center of The Ohio State University in Wooster, Ohio. Because I will remain involved in tree and landscape pest management activities, I will surely see many of you at regional Plant Health Care workshops and other educational programs.

I appreciate the opportunity I've had to work with you and wish everyone the best for the future. I leave you with the immortal words of Louis L'Amour: "We must never forget that the land and the waters are ours for the moment only, that generations will follow who must themselves live from that land and drink that water. It would not be enough to leave something for them; we must leave it all a little better than we found it." *(John Lloyd, The Ohio State University)*

White Grubs Are Here

We have been receiving reports of white grub activity in various parts of the state. In the last newsletter, we reported that grubs were present in McHenry County in the northern part of Illinois. We have also received reports of white grubs in the Collinsville area, with three to five grubs per square foot found in Caseyville. We have a report from Fairview Heights of large numbers of Japanese beetle grubs in turf. Decatur has areas with 25 white grubs per square foot; Urbana has similar numbers. As of September 12, annual white grubs in Urbana were a combination of second and small third instar grubs. These are younger than would be expected this late in the year, indicating that egg hatch was late, grub growth was slow due to cooler soils, or both.

In terms of turf management, even the higher levels of grub infestations do not seem to be causing much damage. This is likely due to frequent rains over the last few weeks. Currently, the turf is able to grow roots as least as fast as the grubs can eat them. As the grubs grow, they will begin to feed more heavily on the roots, making it difficult for the turf to survive. If we have a dry spell in late September or October, the grass will slow its growth rate and damage (brownish areas) will become evident. Irrigation during times of insufficient rainfall may reduce the need for an insecticide application. The combination of winter mortality on the grubs and spring rains will result in fewer actively feeding grubs next spring, which should mean little or no turf damage during the spring in most areas.

If insecticide applications are necessary, use a quick-acting material such as trichlorfon (Dylox, Proxol), bendiocarb (Turcam, Intercept), diazinon, or isozofos (Triumph). Diazinon usually takes three weeks to kill the grubs, but they greatly reduce their feeding during that time. If diazinon is used, make sure that the maximum labeled rate is applied and that the calibration is accurate to achieve a good level of control. (Remember that diazinon is not labeled for use on golf courses and sod farms.) Triumph is labeled for use only on home lawns and sod farms, as

ACES College of Agricultural, Consumer and Environmental Sciences, University of Illinois at Urbana-Champaign

CES Helping You Put Knowledge to Work—State • County • Local Groups
U.S. Department of Agriculture Cooperating
The Cooperative Extension Service provides equal opportunities in programs and employment.

well as on golf course tees, greens, and aprons. Be sure to water-in any insecticide applications with at least 1/2 inch of water to flush the insecticide into the root zone. In areas that are watered infrequently, irrigating the turf a day or two before application will bring the grubs up to the surface roots and improve control. *(Phil Nixon)*

Magnolia Scale

Magnolia scales are large, with mature females growing as wide as 1/2 inch. These scales are yellowish and tend to have an uneven surface, often leading to the assumption that they are some type of fungus fruiting body. Magnolia scale feeds only on magnolia, most commonly *Magnolia stellata, M. acuminata, M. quinquepeta,* and *M. soulangeana.* It produces large amounts of honeydew. The limbs and branches of the host tree become covered with a blackish sooty mold that grows on the honeydew.

The grayish crawlers are produced this time of year and can be controlled with sprays of malathion, diazinon, or insecticidal soap. The crawlers overwinter and can be controlled with the same sprays in the spring. Molting occurs in mid-spring; the resulting nymphs are purplish. The nymphs secrete a whitish, powdery wax over their bodies, which makes them more easily seen. Later in the summer, larger, yellowish adults emerge. *(Phil Nixon)*

PLANT DISEASES

Fungicides: Clarifying the Terminology

Throughout the year we receive many questions about fungicides: Is a systemic fungicide my best bet? Which ones are systemic? How often do I need to apply this product? and so on. These are all good questions and, for the most part, the answers are on the product label. (Of course, everyone enjoys hunting through the label for these tidbits of information, right?) Nevertheless, product labels tell us to do things a certain way. For some people, that is enough; others, however, want to know more. This short article provides a more detailed description of fungicide terminology and use.

Every category of pesticide has its own terminology. Some terms are used interchangeably. For example, the term "contact pesticide" can describe an insecticide, herbicide, or fungicide. In the first case, an insect that comes into contact with the insecticide is killed. In the second case, the herbicide enters and kills only the parts of the plant that are exposed to the herbicide. In the third case, the fungus that attempts to infect the plant sprayed with fungicide will die. These pest-control processes are quite different; although we can (and do) get by with the simpler term "pesticide," the correct terminology is, for example, "contact fungicide as a protectant" or a "protectant-contact fungicide."

Unlike a contact herbicide, a protectant-contact fungicide does not enter the plant at all, but acts as an exterior shield to protect the plant or seed from certain fungi for some period of time. Uniform spray coverage is vital: How well does a shield work if it is filled with holes? The length of protection provided by the protective fungicide depends on many environmental factors. As with any pesticide, rainfall soon after application will wash away much of the pesticide residue, greatly reducing its protective value. Even after drying on the plant surface, residues of a protective fungicide will continue to be lost via rain, dew, vaporization, sunlight, and other means. That's why protective fungicides have shorter application intervals than do systemic fungicides. The addition of a spreader-sticker (one type of adjuvant) to the spray mix may help alleviate both the problems of poor coverage and premature loss of residues. This doesn't necessarily mean that a spreader-sticker should be added to a spray mix in all situations. Adjuvants may increase penetration of systemic fungicides and cause phytotoxicity. Before adding to a spray mix, consider these questions:

1. Does the fungicide formulation already have certain adjuvants included by the formulator? Always read the label directions (especially the fine print) for the fungicide, and for the adjuvant as well. The inclusion other adjuvants may increase runoff and decrease pesticide deposits or cause other problems. The addition of agents to the fungicide during the formulation process is becoming increasingly popular. Unfortunately, the label does not always make this addition apparent to the user (in such cases, adjuvants are considered "secret inert ingredients"— at least to the public and to the competition). Some trade names, such as Daconil Weather Stik, obviously indicate that an agent has been added to the formulation. Even so, always read the label to find out what you can and cannot add to a particular spray mix.
2. Is the plant you want to treat difficult to "wet" (the tissues are quite waxy or hairy)? Have you experienced poor coverage (from poor wetting) in the past?

If you cannot find the answers to your questions, test the mix on a few plants and observe them for signs of injury before implementing full treatment.

While reading fungicide labels and other literature, you might notice the many terms to describe systemic fungicides. Examples include "systemic," "translocated," "eradicant," and "curative." At first glance, these descriptions may seem irrelevant. However, let's take a closer look at these terms, as they apply to protective fungicides.

Translocation is the movement of any compound within the plant body to tissues remote from the site of application. Protective fungicides are not absorbed and not translocated in the plant. They provide an exterior shield of protection against infection only at the site of application.

Local penetrant (also known as "local systemic" or "eradicant") fungicides are absorbed into the immediate area of application and are not translocated in the plant. They cure established infections only at the site of application. The term "local systemic" is a poor choice of words for such fungicides.

Systemic fungicides are absorbed and translocated in the plant. They prevent the development of disease at the site of application, as well as in other parts of the plant.

Curative fungicides are absorbed and translocated in the plant. They eliminate a pathogen after it is already established within plant tissues. Use this term cautiously because people not familiar with plant diseases might be led to believe that their half-dead plant will recuperate after treatment with a curative fungicide.These products must be applied before the pathogen has caused a substantial amount of plant tissue and before obvious symptoms develop.

As you can see, the choice of terminology depends on whether the fungicide is absorbed into the plant or translocated in the plant. People tend to group systemic and curative fungicides together and refer to them simply as "systemics." If a fungicide is considered a systemic, does that mean it travels throughout the entire plant? Not necessarily. In fact, among the fungicides on the market today, relatively few will translocate throughout the entire plant. Most systemics are translocated only upward within the plant's xylem (water-conducting) vessels. This type of translocation is known as "apoplastic" (or "acropetal") translocation. On the other hand, adequate distribution of a fungicide in the phloem (food-conducting) tissues is referred to as "symplastic" (or "basipetal") translocation, which includes translocation down into the roots.

Are there advantages to using systemic rather than protectant fungicides? Systemics provide longer residual activity because they are absorbed by the plant and protected from washoff and weathering. Systemics can protect plant tissues not effectively reached by sprays (crowns, roots, and newly formed tissues). They can also control fungi that have already entered the plant.

The downside to systemic fungicides is these products are relatively new on the market and, not surprisingly, more expensive. Systemics tend to be much more specific—targeting only a few types of fungi—than the older protectant fungicides, which can be good or bad. (Some of the most recent systemics on the market, however, target a greater variety of fungi.) Perhaps the biggest disadvantage of systemics has been development of resistance or tolerance by fungal pathogens. Generally speaking, protectant fungicides tend to affect fungi in more complex ways than do systemics.

What does all of this mean to the fungicide user? When the products are used according to label directions, probably not much. The main point of this article is that fungicides, even those within the systemic group, do not act the same way after application. Thus, application procedures and product expectations should take these differences into consideration. Further information about fungicide use and terminology will be provided in Chapters 1, 4, and 5 of the *1998 Illinois Commercial Landscape and Turf Pest Management Handbook*, available in January 1998. *(Bruce Paulsrud)*

Selected References

Marsh, R.W., ed. *Systemic Fungicides*. 2nd ed. New York: Longman, 1977.

Fermanian, T.W., Shurtleff, M.C., Randall, R., Wilkinson, H.T., and Nixon, P.L. *Controlling Turfgrass Pests*. 2nd ed. Englewood Cliffs, NJ: Prentice-Hall, 1997.

Late Season Leaf Problems

Many tree samples received at the Plant Clinic this time of year have leaf spots from fungal pathogens, leaf injury from insect feeding, or symptoms of scorch. Because most trees have completed the process of bud formation for next year or have obtained maximum carbohydrate transfer from foliage, loss of leaves now probably will not threaten the health of the tree.

The presence of scorch will not usually pose an immediate threat to the tree either, but it may have

long-term health implications. Dozens of factors are responsible for scorch symptoms, as discussed in issue No. 12 of this newsletter. If symptoms recur each year, the health of the tree will be compromised and dieback and decline will occur. Annual appearance of scorch symptoms should trigger an investigation into the cause of the scorch so that the problem can be corrected. No one can simply look at leaves to determine why they are scorched. It is necessary to examine all of the possible causes and assess their likelihood, given the site conditions. For now, keep stressed trees well watered until a hard frost. Also, consider fertilizing the tree this fall, as recommended by horticulture specialists. *(Nancy Pataky)*

Plant Problems with Unknown Cause

The Plant Clinic is a clearinghouse for plant problems. "Clearinghouse" means different things to different people. To many, it means that plant samples can be sent to one place and input is available from many specialists. This is true, with some limitations. Not all specialists are available all the time. They have full-time jobs on campus but usually try to help out when called.

Others believe the clearinghouse concept means that an exact cause can be determined for any plant problem. People with some experience in the plant business know that this is not always possible. At the Plant Clinic, specialists examine the information and sample provided and apply their experience to help determine possible causes for the problem. In many cases a specific insect, pathogen, or chemical may be blamed. More often, however, a number of possible causes are proposed.

When a plant problem is the result of several factors producing a set of symptoms, the term "decline" is often used. Ash decline and pine decline are two common examples. This is not a "cop out" term, but a way to indicate that several pathogens, site stress, weather stress, or other factors are involved. In some cases (for example, pine decline), specialists cannot agree on the stress factors causing decline.

Several plant problems fitting this decline pattern have become evident at the clinic over the last 10 years: white pine decline, ash decline, barberry dieback, euonymus dieback, spruce decline, sweetgum dieback, and oak scorch and dieback. While it would be helpful if there were only one cause of a plant problem, that is often not the case. The Plant Clinic cannot always identify the exact cause of the problem, but it does offer opinions and input from professionals in many different specialties.

Reader input is important to us in tracking the problems occurring throughout the state. Several readers have reported plant problems observed over wide geographical areas. This is helpful even when the cause of the problem is not known. These reports spur specialists to check with other states, check Web sites for possibilities, and be alert when reading plant journal articles. Your input is important to campus specialists. Please keep in touch over the winter months. *(Nancy Pataky)*

Home, Yard and Garden Pest Newsletter *is prepared by Extension specialists from the University of Illinois at Urbana-Champaign and the Illinois Natural History Survey. Information for this newsletter is gathered with the help of staff members, Extension field staff, and others in cooperation with the USDA Animal and Health Inspection Service.*

Major authors are Phil Nixon, (217) 333-6650 and Fredric Miller, (708) 352-0109, entomologists; Nancy Pataky, plant pathologist, (217) 333-0519; Rhonda Ferree, Tom Voigt, and David Williams, horticulturists, (217) 333-0350, and Karel Jacobs, plant pathologist, The Morton Arboretum, (630) 719-5646. Phil Nixon is the executive editor of the Home, Yard and Garden Pest Newsletter. *This newsletter is written by faculty in the Department of Natural Resources and Environmental Sciences and the Department of Crop Sciences.*

COOPERATIVE EXTENSION SERVICE

HOME, YARD & GARDEN PEST NEWSLETTER

college of agricultural, consumer and environmental sciences, university of illinois at urbana-champaign ▲ illinois natural history survey, champaign

No. 20 • October 1, 1997

This newsletter is issued weekly (biweekly in the early spring and late summer) to provide timely information on insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

Two Issues Left

This is the 20th issue of *Home, Yard and Garden Pest Newsletter*; only two issues remain in your 1997 subscription. You'll receive another issue in late October and the final one at the end of November. The last issue (no. 22) will contain an index of the year's topics. As always, suggestions for the content of the newsletter are welcome. Submit them to any author listed at the end of the newsletter or to the executive editor, Phil Nixon, at (217) 333-6650. *(Phil Nixon)*

Subscription at $28 for 1998

Unfortunately, increased expenses are causing a change in the subscription price for *Home, Yard and Garden Pest Newsletter* for 1998. Rising personnel and paper costs and an anticipated increase in postage necessitate the $3 increase. The newsletter is run as a break-even venture with no funds going to the authors; however, costs are accrued for editing, design, and subscription personnel. We work to keep these expenses to a minimum. Subscription renewal forms will be mailed to you this winter. (*Phil Nixon*)

Newsletter Goes on the Web

Home, Yard and Garden Pest Newsletter will be available by subscription on the World Wide Web in 1998. This service will give Web subscribers immediate access to the information in the newsletter. Another feature of the Web version is electronic indexing, which will make pest information searches easier. Paper editions of the newsletter will, of course, continue to be available. (*Phil Nixon)*

HORTICULTURE

Tree and Shrub Fertilization

Fertilization helps maintain the healthy appearance and vigor of trees and shrubs. Vigorously growing plants not only look better but also withstand biological and environmental pressures that can result in plant decline.

Fertilizer applications should be timed so that nutrients are available for periods of rapid growth. Most professionals prefer fertilizing trees and shrubs in early spring, early summer, or late fall. Spring applications provide nutrients for the initial flush of spring growth, when nutrients are often most needed. Fall applications provide nutrients that are absorbed by plants and stored until needed for growth. Additionally, although the top of the plant appears dormant, root growth (and thus nutrient uptake) continues late into the fall. However, nutrients (such as nitrogen) not absorbed by the roots can be lost by leaching and thus not available for spring growth. Fertilizers should not be applied to frozen soil.

Determine the need for fertilization by testing the soil and/or looking for nutrient deficiency symptoms. Nutrient deficiency symptoms include stunted leaves, abnormal leaf color, subnormal growth, and early leaf drop. Diagnosis should be made cautiously because many other factors, such as drought stress, disease, root injury, or herbicide damage, cause these same symptoms. The frequency of application depends on several factors and may vary from an annual treatment to one made every three to four years.

ACES College of Agricultural, Consumer and Environmental Sciences, University of Illinois at Urbana-Champaign

Helping You Put Knowledge to Work—State • County • Local Groups
U.S. Department of Agriculture Cooperating
The Cooperative Extension Service provides equal opportunities in programs and employment.

The preferred method of application is to place fertilizers in holes in the root zone. Because most feeder roots are in the top two feet of soil, this action increases fertilizer contact with feeder roots. Fertilizers should be applied evenly within the plant's dripline. The amount of fertilizer to use should be based on the surface area of the space to be covered. Some recommendations establish rates based on trunk diameter, but these fail to consider the area of application. For example, if you use a diameter-based rate for a large tree growing in a restricted planter area, you may add too many salts to the soil and injure the tree.

The University of Illinois recommends that fall fertilization rates do not exceed 2 to 2-1/2 pounds of actual nitrogen per 1,000 square feet. For trees growing in turf areas, those numbers include nitrogen applied to turf because that nutrient is mobile and will leach to the tree roots.

Many landscapers are concerned that late fall fertilizer applications will result in new succulent growth that is susceptible to frost damage. At that time of year, fertilization alone will not cause additional new growth. Plants will have already set their terminal buds and started their hardening process. However, pruning combined with fertilization *will* result in new growth and frost damage is likely. Therefore, fertilize in the fall but wait until the plants are fully dormant before pruning.

For more information, refer to the horticulture fact sheet *Fertilizing Woody Plants*, # NC-9-84 (cost: 25 cents), available from the University of Illinois at Urbana-Champaign, Department of Horticulture, 1201 S. Dorner Drive, Urbana, IL 61801. (*Rhonda Ferree)*

PLANT DISEASES

Cane Blights of Brambles

Many readers are concerned about bramble appearance this time of year. Diseases that may be involved are anthracnose, cane blight, and spur blight. All are easy to diagnose with the aid of *Report on Plant Diseases* Nos. 700 and 709.

Although fungicides will control these diseases if used as preventive sprays, we prefer to emphasize other measures, namely removing and destroying all fruiting canes as soon as they are done fruiting. The young canes that will bear next year's fruit should be left untouched. This cleanup process decreases the amount of future fungal inoculum and opens the planting to better air circulation and more rapid drying. (*Nancy Pataky)*

Winter Preparation and Disease Prevention

Many gardeners wait until a problem occurs and then scramble to correct the situation before it is too late, often relying upon chemical treatments. An alternative is to consider what can be done to help avoid future disease problems in a lawn or garden. Many plant diseases are best controlled with preventive measures. Chemical rescue treatments may provide temporary relief but are usually not the answer for long-term disease control. These fall lawn and garden cleanup procedures will help prepare plants for winter and discourage development of disease problems.

1. Keep grass mowed until it stops growing. This helps prevent winter injury and damage from snow mold.
2. Prune oak trees now to avoid an increased risk of oak wilt. Pruning from September to early March is recommended because doing so during the growing season attracts bark beetles that transmit the oak wilt fungus. Oak wilt is a potential threat throughout Illinois, but more so in the northern areas.
3. Prune trees and shrubs to remove all dead and seriously cankered wood, as well as any crossing and interfering branches. Opening up the center of woody plants helps promote faster drying, lets in more light, and reduces foliar and stem diseases.
4. Provide recommended winter protection for roses, evergreens, young thin-barked trees, and other sensitive plants.
5. Prune tree and bush fruits according to recommendations by Extension horticulturists.
6. Remove and burn (when possible), compost, or bury plant debris to help control foliar and stem diseases next year.
7. Review a variety of seed and nursery catalogs. Select resistant varieties (if they are otherwise horticulturally acceptable) and plant them where you've had problems in the past but have no rotation options. Choosing disease-resistant hybrids, varieties, and species is usually the least expensive and best long-term method of disease control.
8. Make a map of your flower and vegetable gardens. Next year, move related plants to another area of the garden to keep down soil-borne pathogens. Now is a great time to make soil amendments to improve soil drainage.
9. Divide perennial flowers (when appropriate), remove rotted or diseased parts, and replant them in a new location. (*Nancy Pataky*)

Apple Note

Many gardeners in Illinois grow apple trees. (We know this from the number of questions we receive at the Plant Clinic about apples.) Fruit pathology specialist Dr. Steve Ries recommends pruning apple trees as soon as the crop is removed. It is probably a little better for tree health to prune in March, but it is much easier to do a good job now, when healthy plant material is easy to distinguish from diseased tissue. Ries points out that the primary reason for pruning is to remove dead tissue. This practice will limit the development of fire blight, black rot, sooty blotch, fly speck, and apple scab. If the tree is known to be infected with fire blight, be sure to disinfect the pruners after every cut to prevent further spread of the disease. Disinfecting may be done by dipping the blades in rubbing alcohol or 10% chlorine bleach. (*Nancy Pataky*)

INSECTS

White Grubs

White grubs continue to be reported in high numbers throughout the state. Infestations of 15 to 25 grubs per square foot are common. A dry spell will likely result in widespread grub damage in untreated turf. On the other hand, levels just slightly over the threshold of 10 to 12 per square foot can be tolerated if irrigation is used during dry weather.

Adult Japanese beetles were still present in fairly large numbers in central Illinois through at least September 13. If these beetles were still laying eggs, additional grubs may hatch in October—much later than normal. Adult Japanese beetles usually die out by mid-August. Be watchful for late-hatching grubs, even in treated turf. Most grub insecticides are effective for about one month; trichlorfon (Dylox, Proxol) is effective for about one week. Isofenphos (Oftanol) lasts about two weeks in many areas of the state. Even long-lasting imidicloprid (Merit, Grubex) may no longer be effective if it had been applied in April or May. The point is that insecticide residues may have broken down by the time grubs hatch from recently laid eggs, making grub damage possible in areas where large numbers of adult Japanese beetles were recently present.

White grubs will continue to feed on turf roots as long as the soil temperature in the root zone remains at 50°F or above. As the soil temperature drops below that level, the grubs will move downward where they will overwinter. With root zone soil temperatures in central Illinois at about 65°F, it will take a considerable amount of cold weather to drop those temperatures below 50°F.

In most years, grubs feed on turf roots through mid-October in northern Illinois, early November in central Illinois, and late November in southern Illinois. Before treating in mid- to late fall, pull back the sod and check for grubs in the root zone. If grubs are present, treatment will be effective. (*Phil Nixon*)

Pine Needle Scale

A major pest of landscape pines and Christmas trees, pine needle scale often goes unnoticed until infestations reach damaging levels. High-density infestations can cause yellowing of needles and, in extreme cases, tree death. Fortunately, pine needle scale problems can be avoided with a little effort and a trained eye.

Like their relatives the aphids, scale insects feed on plant juices sucked through needlelike mouthparts. Scales are primarily sedentary insects concealed beneath a protective wax cover, which for the adult female pine needle scale is about 1/8 inch long, white, and generally teardrop shaped. Male scale covers are about half the size of the female's and more rectangular in shape. Beneath the wax cover, the adult female is little more than a purplish blob with no legs or antennae to speak of. These limbs have been all but lost with adaptation to a stationary lifestyle.

Pine needle scale undergoes two generations per year in the Midwest. Eggs remain all winter under covers of females, hatching in about the middle of May. Bright red, pinhead-sized nymphs (known as crawlers) emerge from the eggs. These nymphs have legs and wander the needles searching for a suitable feeding site. Crawlers are the dispersal stage of scale insects and are capable of walking short distances, but they may also spread via wind. Upon finding a suitable site, crawlers insert their mouthparts into the needle and begin feeding; they will remain in that spot for the rest of their lives.

Pine needle scales reach adulthood around the end of June and beginning of July. Tiny winged adult males (about 1/12 inch long) emerge from beneath their covers and search for females. The second generation begins when females lay their eggs in mid- to late July, with crawlers emerging near the end of July. This second generation reaches adulthood in September or early October, when females lay the eggs that will overwinter.

Pine needle scale occurs on a wide variety of coniferous trees but is most abundant and damaging on Scotch and mugo pines. The scale rarely becomes a problem in natural settings such as forests or woods, where natural enemies tend to maintain scale infestations at very low densities. Areas of low plant diversity, such as ornamental landscapes and tree farms, tend to support low densities and diversities of enemies. In these areas, scale infestations are free to grow relatively unchecked.

Scouting for pine needle scale is an effective means of minimizing damage to trees. The scale tends to be most abundant on the lower and interior branches. Clipping infested needles or branches is an easy way to reduce light or medium infestations. Heavy infestations may require chemical controls. Because of the protective wax cover of the older scales, insecticides are most effective if applied when crawlers are active. Good control can be obtained with traditional insecticides such as Sevin, Orthene, and Malathion; however, horticultural oils are also effective and easier on natural enemies that contribute to pest control. Natural enemies such as ladybeetles, tree crickets, earwigs, and some parasitic wasps are thought to suppress scale populations.

Methods of improving the efficacy of some natural enemies in controlling pine needle scale, including tiny stingless wasps that parasitize the scale, are currently under investigation in the Department of Entomology at the University of Illinois at Urbana-Champaign. Presently, we are evaluating the influence of habitat on parasite abundance and hope to develop techniques for enhancing parasitism through landscape design. *(John Tooker and Larry Hanks, Department of Entomology)*

Home, Yard and Garden Pest Newsletter *is prepared by Extension specialists from the University of Illinois at Urbana-Champaign and the Illinois Natural History Survey. Information for this newsletter is gathered with the help of staff members, Extension field staff, and others in cooperation with the USDA Animal and Health Inspection Service.*

Major authors are Phil Nixon, (217) 333-6650 and Fredric Miller, (708) 352-0109, entomologists; Nancy Pataky, plant pathologist, (217) 333-0519; Rhonda Ferree, Tom Voigt, and David Williams, horticulturists, (217) 333-0350, and Karel Jacobs, plant pathologist, The Morton Arboretum, (630) 719-5646. Phil Nixon is the executive editor of the Home, Yard and Garden Pest Newsletter. *This newsletter is written by faculty in the Department of Natural Resources and Environmental Sciences and the Department of Crop Sciences.*

COOPERATIVE EXTENSION SERVICE

HOME, YARD & GARDEN PEST NEWSLETTER

college of agricultural, consumer and environmental sciences, university of illinois at urbana-champaign ▲ illinois natural history survey, champaign

No. 21 • October 29, 1997

This newsletter is issued weekly (biweekly in the early spring and late summer) to provide timely information on insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

Turf-Related Events for Your Calendar

Two turf-related events cosponsored by the University of Illinois Extension take place this fall.

The first is the 1997 University of Illinois–Central Illinois Golf Course Superintendents Association Educational Seminar scheduled for Wednesday, November 12, 1997, at the Radisson Hotel in Bloomington, Illinois. This event will provide up-to-date information and education for golf course personnel. Speakers at this one-day seminar include university personnel from the Midwest, along with local golf-turf professionals. There is a fee for this seminar, and preregistration is requested.

The second event is the 1997 North Central Turfgrass Exposition (NCTE), December 1 through 4 at the Pheasant Run Resort in St. Charles, Illinois. The NCTE provides educational opportunities from Monday afternoon through Thursday morning for individuals in golf course, sports turf, lawn care, sod production, landscape, and other "green" industries. The trade show features more than 80 vendors and 170 booths and is open on Tuesday and Wednesday of the show. The North Central Turfgrass Exposition is cosponsored by University of Illinois Extension and is coordinated by the Illinois Turfgrass Foundation. Registration fees can be paid in advance or at the door during the Exposition.

For additional information about either of these activities, call University of Illinois Extension turfgrass specialist Tom Voigt at (217) 333-7847. (*Tom Voigt*)

PLANT DISEASES

Pine Wilt

Pine wilt is caused by the pinewood nematode, which is vectored from tree to tree via the Sawyer beetle. Look for flagging (appearance of dead branches) or sudden decline and death of an entire tree within a few weeks or months of initial symptoms. We have seen this disease on most pines in Illinois, especially Scotch and Austrian, but it is rare on white pine. If your white pines die suddenly, check their root systems: white pines have been plagued by problems related to root rot, and they are also susceptible to the effects of site and environmental stress. Over the years, the Plant Clinic has tested hundreds of white pines for the presence of pinewood nematodes. In all that time, the clinic has found only two cases of pinewood nematode on white pine—and one of those nematodes was dead when sampled.

As discussed in issue numbers 8 and 17 of this newsletter, the only method of control that we can suggest for pine wilt is to break the disease cycle by removing dead trees as soon as possible. If your pines are dead now, they are certainly not going to "green-up" or come back to life in the spring. If you cannot rule out pine wilt as the cause of death, play it safe by removing the trees to prevent the possible spread of the nematode to healthy pines in the area. The wood must be burned, buried, or removed from the site to prevent insect ovipositing and overwintering in infected wood.

The question often arises as to whether wood infested by pinewood nematode can be chipped and safely used for mulch. So far, research leads us to believe that such a practice is fairly safe. The research has shown that the insects do not survive the chipping process, that the nematode does not infect through the roots, and that the insect does not inhabit wood chips. Logically, there is no way for the nematode to move

ACES College of Agricultural, Consumer and Environmental Sciences, University of Illinois at Urbana-Champaign

Helping You Put Knowledge to Work—State • County • Local Groups
U.S. Department of Agriculture Cooperating
The Cooperative Extension Service provides equal opportunities in programs and employment.

out of the chips and into a tree. To be safe, though, spread the mulch on a concrete or blacktop surface and let it dry before use, or put it through a true compost cycle. (*Nancy Pataky*)

INSECTS

Gypsy Moth Survey

The Illinois Department of Agriculture, in association with the USDA, has completed its 1997 gypsy moth survey and analyzed the data. A total of 34,841 moths were collected in pheromone traps—a marked increase from the 2,643 moths collected in 1996. The areas of heaviest counts are in the five northeastern-most counties of Illinois (Lake, McHenry, Kane, Cook, and DuPage), accounting for 33,714 moths. In 1996, these counties trapped 2,608 moths. Within those five counties, areas near the shore of Lake Michigan from Evanston northward had the heaviest moth catches.

Almost all of the counties in the northern one-quarter of Illinois had positive moth catches in 1997: Jo Daviess, Stephenson, Winnebago, Boone, McHenry, Lake, Cook, DuPage, Kane, DeKalb, Ogle, Carroll, Whiteside, Lee, Rock Island, Henry, La Salle, Kendall, Will, Grundy, Kankakee, and Livingston. All of the counties in the northern half of the state (generally, counties north of Springfield) were trapped in 1997. Of the counties trapped, 28 did not have any moths.

In 1996, all counties in the southern half of Illinois were trapped (that is, every county that was not trapped in 1997). The northern Illinois counties of Stephenson, Winnebago, Boone, McHenry, Lake, Kane, Cook, DuPage, Kendall, and Will were also included in the 1996 trapping program. Of these northern counties, all except Stephenson had moth catches. The entire northern half of the state was also trapped in 1995, with positive catches in Winnebago, Boone, McHenry, Lake, Cook, DuPage, Kane, DeKalb, Kankakee, Peoria, McLean, and Vermilion counties. Again, the northeastern counties of McHenry, Lake, Cook, DuPage, and Kane accounted for most of the catches, with 2,068 moths trapped that year.

Large numbers of gypsy moths have been found in Michigan for many years. In Wisconsin, Door County and some other areas have had high moth counts for the last few years. Accidental human movement of caterpillars and eggs during vacations, business trips, and household moves probably accounts for many of the new sitings. In areas near Wisconsin, natural spread is also likely.

Hatchling gypsy moth caterpillars climb to the tops of trees, spin out strands of silk, suspend themselves on the strands, and are blown to new feeding sites. In wooded areas, caterpillars on their strands of silk may be carried on the wind for several hundred yards. In more open areas, they can be blown for several miles.

The Illinois Department of Agriculture, with the cooperation of the USDA and the affected communities, will continue the eradication efforts that have been so successful in eliminating isolated gypsy moth infestations over the past 25 years in Illinois. Unfortunately, the numbers of trapped moths have never before been this large. With nearby states containing large numbers of gypsy moths, continual reinfestation is likely.

Successful eradication in Illinois and in nearby states probably depends on some help from nature. Gypsy moth eggs are killed at temperatures of –20°F and lower; three consecutive days at those temperature will kill almost all of the overwintering eggs. Eradication of the caterpillars hatching from the few surviving eggs would then be likely.

Thanks to Stan Smith, Illinois Department of Agriculture, for supplying the survey counts used in this article. (*Phil Nixon*)

Spider Ballooning

Huge amounts of silk webbing are being reported, particularly in the northern and northwestern areas of the state. Silk webbing is noticeably coating turf areas and hanging from trees and buildings.

This phenomenon is caused by ballooning spiders. When spiders hatch from their eggs, they climb to a high location and spin out long strands of silk. This silk is caught on the wind and carries the spiderling for long distances. These silk strands with their spiderlings have been collected by airplanes thousands of feet above the ground. Charles Darwin noted ballooning spiders on the rigging of the ship HMS Beagle several hundred miles from land. The presence of spiders on volcanos and other locations where spiders could not live has established scientifically that spiders can balloon for at least 18 miles.

The eggs of different species of spiders hatch at various times during the growing season, so ballooning spiders can be found throughout the warmer months. The eggs of many spider species hatch during the fall, making ballooning spiders common this time of year.

Once the spiderlings are carried to appropriate locations, they find a crack or crevice in which to hide through the winter. They emerge in the spring to begin feeding on insects and other small animals.

The silk strands are not likely to cause any damage to turf or other ornamental plants and control measures are not recommended. After all, the next puff of wind will just bring more strands of silk and their passenger spiderlings. (*Phil Nixon*)

HORTICULTURE

Pesticide Storage Requirements

Pesticides used in the landscape are manufactured, formulated, and packaged to specific standards. However, when stored improperly, pesticides can break down, especially under conditions of high temperature and humidity. Some pesticides can lose their active ingredients through chemical decomposition or volatilization. Dry formulations such as wettable powders can become caked and compacted; emulsifiable concentrates can lose their ability to form emulsions. Some pesticides become more toxic, flammable, or even explosive as they break down.

Pesticide formulations that contain low concentrations of active ingredients generally lose effectiveness faster than more concentrated forms. Sometimes a liquid pesticide develops gas as it deteriorates, making opening and handling containers quite hazardous. Over time, the gas pressure may cause the container to rupture or explode.

Certain pesticides have characteristic odors. A strong odor in the storage area may indicate a leak, spill, or improperly sealed container. It may also be a clue that the pesticide is deteriorating because the smell of some chemicals intensifies as they break down. If none of these problems are found, you can reduce chemical odors by installing an exhaust fan or lowering the temperature of the storage area.

Characteristics that affect shelf life include the pesticide formulation (liquid concentrate, wettable powder, granules), types of stabilizers and emulsifiers used, chemical nature and stability of the pesticide, and type of container and its closure. Pesticide containers have an important impact on storage and shelf life. If stored for long periods, these containers may eventually corrode, crack, break, tear, or fail to seal properly. Also, their labels may become illegible. If you find a damaged container, transfer its contents to a similar sturdy container that can be sealed. Be sure to transfer the label to the new container. **Never put a pesticide in a food or drink container!**

Pesticides can have an extended shelf life if the storage area is cool, dry, and out of direct sunlight. Protection from temperature extremes is important because heat or cold can shorten pesticide shelf life. At temperatures below freezing, some liquid formulations separate into their various components and lose their effectiveness. High temperatures cause many pesticides to volatilize or break down more rapidly. Extreme heat may also cause glass bottles to break or explode.

Pesticides packaged in paper or cardboard containers should be stored on shelves to keep them away from water or dampness on the floor. To prevent cross-contamination, separate volatile herbicides and other pesticides. Keep all corrosive chemicals in their proper containers to prevent leaks. Even the simple step of tightly closing lids and bungs on containers can help extend pesticide shelf life.

One way to minimize loss, cost, and disposal problems associated with pesticides is to avoid mixing more pesticides than you will use in a reasonable period of time. Be sure to date the containers and keep a current inventory of supplies. Avoid stockpiling; buy what you need, but not to excess. Even with careful planning, it is sometimes necessary to carry pesticide stocks over from one year to the next. Check dates of purchase at the beginning of each season and use the oldest material first. To keep the label on a container intact and legible, cover it with transparent tape or lacquer. Given proper storage, some pesticides may remain active for a number of years.

The following list contains shelf-life information and storage guidelines for many pesticides.

bensulide (Betasan, Bensumec): Granules are stable. Emulsifiable liquids may crystallize below 42°F, but crystals redissolve if stored or warmed at high temperatures.

captan: Stable for at least two years under normal storage conditions. Protect from extreme heat.

carbaryl (Sevin): Repeated freezing/thawing cycles may decrease effectiveness of flowable formulation. Wettable powders are quite stable under normal storage conditions.

DCPA (Dacthal): Store in a dry place. Wettable powders are stable for at least two years under proper storage conditions.

diazinon: Use 4E within six months of opening container. Do not store near a heat source. Keep lids tightly closed; keep granular materials and dusts dry.

dichlobenil (Casoron, Barrier, Dyclomec): Granules are stable for at least two years if stored in tightly sealed containers and kept in a cool, dry place.

dicofol (Kelthane): Wettable powders are stable under normal storage conditions.

dimethoate (Cygon, De-Fend): Liquid formulations should be stored above freezing temperatures. Dimethoate is flammable, so keep it away from heat and open flame. Its flash point range is 73 to 100°F.

glyphosate (Roundup): Store above 10°F to prevent freezing, which results in crystals that settle to the bottom of the container. Do not store, mix, or apply in galvanized steel or unlined steel containers.

malathion (Cythion): Wettable powders are stable for at least two years when stored properly. Do not store liquid formulation below 0°F. Keep away from heat sources.

metam-sodium (Vapam): Do not store below 0°F. This pesticide crystallizes at lower temperatures. Warm or store at higher temperatures; mix to dissolve crystals and ensure uniformity before use.

simazine (Princep): Wettable powders and granules are stable for at least two years under normal conditions. Simazine is nonflammable.

trifluralin (Treflan, Preen): If stored for long periods below 40°F, emulsifiable concentrate formulations may provide poor weed control. Trifluralin's flash point is 119°F, so do not store near a heat source. It is stable for at least two years with cool, dry storage. (*Fredric Miller and Phil Nixon*)

Bi-State Horticulture Conference

During the winter, many opportunities are available throughout Illinois for continued education in horticulture. One relatively new offering that targets the commercial horticulture industries in northwestern Illinois and northeastern Iowa is the Bi-State Horticulture Conference. The conference includes general sessions as well lectures. The lectures are divided into two tracks: one focusing on the turf industry, the other on landscape and arboriculture industries.

This year's conference will be Wednesday, November 5, 1997, from 8:30 a.m. to 4:00 p.m. at the Holiday Inn, Quad Cities Airport, in Moline, Illinois. The deadline for advance registration is October 31, 1997. At-the-door registrations are accepted, but lunch will not be included. The registration fee is $25 per person. Advance registration is being accepted by the Rock Island Extension office, 1414 Tenth Street, Suite 1, Silvis, IL 61282 [phone: (309) 796-0512; fax (309) 796-0673]. Checks should be made payable to the University of Illinois.

Continuing education units for this conference have been approved by the Illinois Golf Course Superintendents Association of America. The Illinois Nursery Professional Association has also approved continuing education units for recertification.

For more information about the Bi-State Horticulture Conference or the continuing education units offered, call Martha Smith, Extension educator in horticulture, at (309) 836-3366. (*Nancy Pataky*)

Home, Yard and Garden Pest Newsletter *is prepared by Extension specialists from the University of Illinois at Urbana-Champaign and the Illinois Natural History Survey. Information for this newsletter is gathered with the help of staff members, Extension field staff, and others in cooperation with the USDA Animal and Health Inspection Service.*

Major authors are Phil Nixon, (217) 333-6650 and Fredric Miller, (708) 352-0109, entomologists; Nancy Pataky, plant pathologist, (217) 333-0519; Rhonda Ferree, Tom Voigt, and David Williams, horticulturists, (217) 333-0350, and Karel Jacobs, plant pathologist, The Morton Arboretum, (630) 719-5646. Phil Nixon is the executive editor of the Home, Yard and Garden Pest Newsletter. *This newsletter is written by faculty in the Department of Natural Resources and Environmental Sciences and the Department of Crop Sciences.*

COOPERATIVE EXTENSION SERVICE

HOME, YARD & GARDEN PEST NEWSLETTER

college of agricultural, consumer and environmental sciences, university of illinois at urbana-champaign ▲ illinois natural history survey, champaign

No. 22 • November 26, 1997

This newsletter is issued weekly (biweekly in the early spring and late summer) to provide timely information on insect, weed, and plant disease pests of the home, yard, and garden. Current control procedures, application equipment and methods, safe storage and disposal of pesticides, and other topics of interest are discussed.

Last Issue for 1997

This is the 22nd and final issue of *Home, Yard, and Garden Pest Newsletter* for this publication year, and it contains the index for 1997. We will resume publication in mid-April 1998 (depending on how early spring arrives). Order forms for subscribing to the 1998 edition of the newsletter will be mailed in February. If you do not receive a subscription brochure, please call 1-800-345-6087.

We are interested in making this newsletter as useful as possible for professional ornamental horticulturists. As always, your comments are appreciated by me (as newsletter coordinator) and the contributing authors. *(Phil Nixon)*

HYG Online in 1998

Home, Yard and Garden Pest Newsletter will be available by subscription on the World Wide Web beginning with the first issue in 1998 (mid-April). Temporary, free access to the Home, Yard and Garden Pest Web site will be available soon at http://www.ag.uiuc.edu/cespubs/hyg/. Three issues of the newsletter will be on the sample site to give people a chance to explore all the features that will be offered to Web subscribers next year.

The benefits of a Web subscription include immediate availability of the newsletter, a keyword search function, and convenient access to previous newsletters and articles. The Web version of the newsletter will also include features not available to print subscribers, such as links to other Web sites and a listing of announcements and meetings.

The Web subscription rate is $25. Subscribers can also choose a combination of regular mail delivery and the Web for $40. The price for a mail subscription is $28, by fax $60. An online subscription form will be ready soon. *(Peggy Currid)*

HORTICULTURE

Winter Preparation for Ornamental Plants ... It's Not Too Late

This winter seems to have crept up on us before we realized what was happening. Many of us were not able to prepare our plants the way we normally would. Although we are past the ideal time for many preparations, there are several items you might still consider to prepare plants for the depths of winter.

Needled and broadleaf evergreens are susceptible to winter burn caused by desiccation. This occurs when frozen soil reduces water absorption while the plants are exposed to drying winds and deicing salts. Needles or leaves typically begin to turn brown at the tip and brown further backward, depending on severity. One way to help prevent rapid moisture loss through the leaves or needles is with antitranspirants, which help reduce transpiration. Antitranspirants should be applied now—before severe winter sets in.

Other types of cold injury include sunscald and frost cracks. Sunscald and frost cracks are caused by extreme temperature fluctuations. Sunscald is actually a freezing injury and is most likely to occur on young trees. Sunscald spots may develop into a frost canker. Use tree wraps on susceptible trees to help reduce the risk of damage from temperature fluctuation.

Frost cracks occur when the outside cells of the tree lose water, shrink, and pull apart—causing a crack to open longitudinally with the grain of the wood. Again, tree wraps may help, but some species are simply more prone to cracking than others. Trees

shaded on the south and west sides, where the tree heats up the most, will sometimes crack less.

Roses typically need additional protection, and it is not too late to cover them. Ideally, excessively long canes of hybrid teas, floribundas, grandifloras, and polyanthas should have been pruned back slightly by now. Because the plants should be covered after they go dormant, do that now. Bushel baskets or commercial covers work well. You will need to trim the canes back to fit underneath the cover. Other ways of protecting the roses include covering with leaves (oak work best), pine needles, straw, old sawdust, or bark chips. The depth of the material should be 12 inches. Soil is not recommended as a cover because it stays too wet and packs too solidly. In the spring, remove the cover or mulch, trim the canes back to healthy wood (just above the strong bud), and thin the plants to four or five canes.

Climbing and rambling rose canes may also need winter protection. Lay the canes on a bed of straw and cover them with more straw. Be sure to cover the crowns. Keep the straw in place by tying it or covering it with a small amount of soil. In the spring, remove the covering, remove all damaged wood, and place the canes or shoots back on the trellis.

Because of our late fall, many trees did not drop their leaves until recently. If possible, you should still try to remove the fallen leaves—particularly because leaves left on the ground could damage grass. Additionally, many leaves house pathogens capable of causing disease the following year. Dispose of leaves through community programs or use them as mulch or in a compost pile. Check with your local law enforcement agency or fire department before burning leaves, because many local governments prohibit leaf burning.

In summary, the more work done through the fall and winter, the less spring cleanup will be required. Be sure to properly discard all plant wastes. Do not remove winter-protective devices too early in the spring. In areas subject to many late heavy snowstorms and temperature extremes, early mulch removal might be a serious mistake.

For more information, obtain the horticulture fact sheet *Winter Protection for Woody Plants*, # LH 179. *(Rhonda Ferree and Jim Schmidt)*

Plants Not Favored for Browsing by Deer

Deer are becoming an increasing problem in the Midwest, especially for homeowners living near woodlands. As open land continues to be developed, less open space is available for the deer to live. In the open space that remains, the deer population develops unchecked because there are no natural predators, such as wolf, cougar, and coyote. In good habitats, the deer population can more than double each year.

Deer damage plants in two ways: battering by antlers and browsing. Battering occurs in late summer and fall. Young trees, two to three inches in diameter, are used for "sparring practice." During late fall and winter, deer browse (feed) on young succulent twigs when other foods are less available. New buds and shoots are also browsed in spring and early summer.

Staff members at The Morton Arboretum are frequently asked to suggest plants that are not eaten by deer. It is important to realize that deer will eat almost any plant if they are under enough pressure, such as snow cover and overcrowding. The plants in the following lists are not favored for browse by deer. The list was compiled based on the observations of Pete van der Linden, Curator of Plant Collections, The Morton Arboretum, Lisle, Illinois, and Galen Gates, Manager of Horticulture Collections, Chicago Botanic Garden, Glencoe, Illinois. The book *Gardening in Deer County* by Karen J. Bernard (Croton-on-Hudson, New York. 54 pp.) was also used as a source. *(Written by Kris R. Bachtell, The Morton Arboretum; submitted by Phil Nixon)*

Trees Not Favored by Deer

Ash (*Fraxinus*)
Beech (*Fagus*)
Birch (*Betula*)
Catalpa (*Catalpa*)
Cedar (*Juniperus*)
Chestnut *(Castanea)*
Cypress (*Taxodium*)
Dawn redwood (*Metasequoia*)
Ginkgo (*Ginkgo*)
Hemlock (*Tsuga*)
Ironwood (*Ostrya*)
Larch (*Larix*)
Locust, black (*Robinia*)
Locust, honey (*Gleditsia*)
Mimosa/silktree (*Albizia*)
Redbud (*Cercis*)
Sassafras (*Sassafras*)
Smoketree (*Cotinus*)

(continued next page)

Trees Not Favored by Deer (cont.)
Sourwood (*Oxydendrum*)
Sweet gum (*Liquidambar*)
Spruce (*Picea*)
Sycamore (*Platanus*)
Tree lilac (*Syringa reticulata*)
Tuliptree (*Liriodendron*)

Shrubs Not Favored by Deer
Barberry (*Berberis*)
Boxwood (*Buxus*)
Coralberry (*Symphoricarpos*)
Forsythia (*Forsythia*)
Juniper (*Juniperus*)
Kerria (*Kerria*)
Lilac (*Syringa*)
Oregon-grape (*Mahonia*)
Smoke bush (*Cotinus*)
Snowberry (*Symphoricarpos*)
Spicebush (*Lindera*)
Spirea (*Spiraea*)
Sweet shrub (*Calycanthus*)
Witch-hazel (*Hamamelis*)

Groundcovers Not Favored by Deer
Ajuga (*Ajuga*)
Barren strawberry (*Waldsteinia*)
Bergenia (*Bergenia*)
Bunchberry (*Cornus*)
Catmint (*Nepeta*)
Epimedium (*Epimedium*)
Ferns (various species)
Ginger (*Asarum*)
Indian strawberry (*Duchesnea*)
Juniper (*Juniperus*)
Lady's mantle (*Alchemilla*)
Lamium (*Lamium*)
Lily-of-the-valley (*Convallaria*)
Lily turf (*Liriope spicata*)
Lungwort (*Pulmonaria*)
Mosses
Pachysandra (*Pachysandra*)
Potentilla (*Potentilla*)
Sedum (*Sedum*)
Sempervivum (*Sempervivum*)
Snow-in-summer (*Cerastium*)
Sweet woodruff (*Asperula*)
Vince (*Vinca*)
Violet (*Viola*)
Wild strawberry (*Fragaria*)
Willow (*Salix*)

Perennial Vines Not Favored by Deer
Akebia (*Akebia*)
Bittersweet (*Celastrus*)
Clematis (*Clematis*)
Grape (*Vitus*)
Honeysuckle (*Lonicera*)
Ivy, Boston (*Parthenocissus*)
Silver lace vine (*Polygonum*)
Trumpet creeper (*Campsis*)
Virginia creeper (*Parthenocissus*)
Wisteria (*Wisteria*)

Deer-Resistant Hardy Bulbs
Allium (*Allium*)
Chionodoxa (*Chionodoxa*)
Colchicum (*Colchicum*)
Crown imperial (*Fritillaria*)
Crocus (*Crocus*)
Daffodil (*Narcissus*)
Eranthis (*Eranthis*)
Fritillary (*Fritillaria*)
Grape hyacinth (*Muscari*)
Narcissus (*Narcissus*)
Puschkinia (*Puschkinia*)
Scilla (*Scilla*)
Snowdrop (*Galanthus*)
Snowflake (*Leucojum*)

Deer-Resistant Annuals and Biennials
African daisy
Ageratum (*Ageratum*)
Alyssum (*Lobularia*)
Campanula (*Campanula*)
Candytuft (*Iberis*)
Forget-me-not (*Myosotis*)
Four o'clock (*Mirabilis*)
Foxglove (*Digitalis*)
Heliotrope (*Heliotropium*)
Larkspur (*Delphinium*)
Lobelia (*Lobelia*)
Marigold (*Tagetes*)
Mimulus (*Mimulus*)
Morning glory (*Ipomoea*)
Moonflower (*Ipomoea*)
Nasturtium (*Tropaeolum*)
Petunia (*Petunia*)
Poppy (*Papaver*)
Salvia (*Salvia*)
Snapdragon (*Antirrhinum*)
Stocks (*Matthiola*)
Sunflower (*Helianthus*)

(continued next page)

Deer-Resistant Annuals and Biennials (cont.)
Sweet William (*Dianthus*)
Thistle (*Cirsium*)
Tithonia (*Tithonia*)

Deer-Resistant Hardy Perennials
Aconite (*Aconitum*)
Alyssum (*Lobularia*)
Anemone (Anemone)
Artemisia (*Artemisia lactiflora*)
Astilbe (*Astilbe*)
Bee balm (*Monarda*)
Bergenia (*Bergenia*)
Black-eyed Susan (*Rudbeckia*)
Butterfly weed (*Asclepias*)
Columbine (*Aquilegia*)
Coreopsis (*Coreopsis*)
Crane's bill (*Geranium*)
Cyclamen (*Cyclamen*)
Daisy (*Chrysanthemum*)
Dame's rocket (*Hesperis*)
Fleabane daisy (*Eirgeron*)
Foam flower (*Tiarella*)
Gentian (*Gentiana*)
Geum (*Geum*)
Goldenrod (*Solidago*)
Hellebore (*Helleborus*)
Hibiscus (*Hibiscus*)
Iris (*Iris*)
Jacob's ladder (*Polemonium*)
Loosestrife (*Lythrum*)
Lychnis (*Lychnis*)
Lythrum (*Lythrum*)
Marsh marigold (*Caltha*)
Meadow rue (*Thalictrum*)
Meadow sweet (*Filipendula hexapetala*)
Peony (*Paeonia*)
Phlox (*Phlox*)
Pinks (*Dianthus*)
Purple Coneflower (*Echinacea*)
Rock cress (*Arabis*)
Russian sage (*Perovskia*)
Salvia (*Salvia*)
Sedum (*Sedum*)
Sempervivum (*Sempervivum*)

Deer-Resistant Hardy Perennials (cont.)
Snakeroot (*Eupatorium*)
Sneezeweed (*Helenium*)
Snow-in-summer (*Cerastium*)
Soapwort (*Saponaria*)
Toadflax (*Linaria*)
Valerian (*Valeriana*)
Veronica (*Veronica*)
Violet (*Viola*)
Yarrow (*Achillea*)
Yucca (*Yucca*)

Deer-Resistant Herbs
Angelica (*Angelica*)
Artemisia (*Artemisia*)
Basil (*Ocimum*)
Borage (*Borago*)
Burnet (*Sanguisorba*)
Catmint (*Nepeta*)
Chamomile (*Matricaria*)
Chives (*Allium*)
Comfrey (*Symphytum*)
Dill (*Anethum*)
Fennel (*Foeniculum*)
Feverfew (*Chrysanthemum*)
Germander (*Teucrium*)
Horehound (*Marrubium*)
Hyssop (*Hyssopus*)
Lamb's ears (*Stachys*)
Lavender (*Lavendula*)
Lemon balm (*Melissa*)
Lovage (*Levisticum*)
Mint (*Mentha*)
Mullein (*Verbascum*)
Oregano (*Origanum*)
Parsley (*Petroselinum*)
Perilla (*Perilla*)
Rosemary (*Rosmarinus*)
Rue (*Ruta*)
Sage (*Salvia*)
Santolina (*Santolina*)
Savory (*Satureja*)
Tansy (*Tanacetum*)
Thyme (*Thymus*)

Cooperative Extension Service
University of Illinois at Urbana-Champaign

The Illinois Pesticide Review

New About Pesticides and Regulations

1201 S Dorner Dr. Urbana, IL 61801 (2170 244-4397

Vol. 10, No. 3 November 1997

Editorial Comment

I am extremely excited about this issue of the *Illinois Pesticide Review (IPR)* newsletter. The *IPR* is growing and changing to meet our goals and our clientele's needs. Due to increasing requests for this newsletter, we are now offering it as a paid subscription through ACES's Newsletter Service. Starting January 1998, the *IPR* will be available for $15 per year. However, we will continue to offer this newsletter free of charge to those with Internet capabilities. It is available at **<www.aces.uiuc.edu/~pse/>.**

The *IPR* design is being updated, and the newsletter will now be produced on a regular bimonthly schedule. Similar to this issue, each *IPR* provides pertinent, up-to-date pesticide and pesticide-related information. Members of the Pesticide Safety Education program at the University of Illinois strive to remain current on pesticide-related issues and work hard to foster partnerships with others who do the same, such as the Illinois Department of Agriculture (IDA), US-EPA, grower organizations, environmental groups, and more.

In addition, each issue will spotlight a part of University of Illinois research, teaching, or outreach that pertains to pesticides. This issue, we spotlight the ever popular and important Plant Clinic. Future articles may feature pesticide-related research, other pesticide programs, related classes and degree programs, Extension programs, or other interesting and important work done at the University of Illinois that pertains to pesticides.

As always, I welcome comments and suggestions. Let me know if the *IPR* meets your needs!

(Rhonda J. Ferree)

Endocrine Disruptors

Concerns about pesticides and other chemicals functioning as endocrine disruptors in wildlife and people have made the news several times in the last couple of years. The most common of these have been chemicals that mimic the human hormone estrogen.

The endocrine system in humans and other animals is a series of glands, including pituitary, thyroid, and adrenal glands, as well as ovaries or testes. These glands produce hormones, such as adrenalin and adrenalin and estrogen, that travel through the bloodstream and guide development, growth, reproduction, and behavior.

Endocrine effects can take a couple of different forms. An endocrine *modulator* causes a temporary hormonal response that results in a reversible change in the endocrine system. An example is the use of estrogen in birth control pills. An endocrine *disruptor* causes a permanent change in the endocrine system.

Effects of dicofol on alligators and turtles in Apopka, Florida, and of

In This Issue

College of Agricultural, Consumer and Environmental Sciences
University of Illinois at Urbana-Champaign, Urbana, Illinois
State/County/Local/U.S. Department of Agriculture Cooperating

dioxin and PCBs on fish-eating birds and lake trout in the Great Lakes are two of the more heavily studied endocrine-disrupter situations in nature. Commonly, the effects of these hormone "mimics" are that one sex or the other develops almost exclusively, resulting in major drops in the population for the affected wildlife species. An increase in a substance that mimics a sex hormone can cause developing animals of one sex to underdevelop sexually and the other sex to become sexually malformed. Both sexes usually become less fertile or even sterile, depending on the animal species, the endocrine disruptor, and the concentration of the chemical.

Less obvious affects of endocrine disruptors include dead embryos, birth defects, and developmental abnormalities. Although most studies have been on wildlife, effects on humans are documented. The health advisories against high consumption of fish from the Great Lakes by pregnant and nursing mothers are the results of these studies on humans. In these studies, affected children showed reduced neuromuscular skills, poorer memory, lower IQs, and poorer reading abilities. The individuals that are most affected are the developing young because endocrine disruptors cause permanent changes there. In adults, endocrine disruptors cause temporary changes, and removal of the disruptor allows the endocrine system to return to normal.

PCBs and styrenes have been found to be the most common endocrine disruptors in the environment. However, a breakdown product of DDT is estrogenic in mammals and birds and causes the early ceasing of mother's milk production in humans. Atrazine also has been shown to have some endocrine-disruptor effects on alligators and some strains of mice. The Illinois Environmental Protection Agency has published the list of pesticides in Table 1 that have been found to be known, probable, and suspect endocrine disruptors. This list was based on a search of the scientific literature and is highly disputed by some scientists and industry. It does, however, serve as a basis for refinement through appropriate additions and deletions.

As can be seen in Table 1, there are several pesticides that are no longer registered in the United States, such as 2,4,5-T and the organochlorine insecticides aldrin, chlordane, DDT, dieldrin, endrin, heptachlor, and toxaphene.

Table 1. Preliminary List of Chemicals Associated with Endocrine System Effects in Animals and Humans, as of October 16, 1996.

Known	*Probable*	*Suspect*
atrazine (Atrazine)	alachlor (Lasso)	aldicarb (Temik)
chlordane (Chlordane)	aldrin (Aldrin)	carbaryl (Sevin)
DDT (DDT)	amitrole (Amitrole)	cypermethrin (Ammo,
dibromochloropropane (Nemafume)	benomyl (Benlate)	Cymbush, Demon)
dicofol (Kelthane)	2,4-D	esfenvalerate (Asana)
dieldrin	endrin	fenvalerate (Tribute)
endosulfan (Thiodan)	heptachlor	malathion
lindane	hexachlorobenzene	methomyl (Lannate)
methoxychlor (Marlate)	mancozeb (Manzate, Dithane)	metribuzin (Sencor)
toxaphene	maneb	nitrofen
tributyl tin	methyl parathion	permethrin (Ambush, Pounce)
	metiram (Polyram)	ziram
	mirex	
	parathion (ethyl parathion)	
	pentachlorophenol (PCP)	
	2,4,5-T	
	trifluralin (Treflan)	
	vinclozolin (Ronilan)	
	zineb	

The U.S. Environmental Protection Agency (US-EPA) currently requires tests for effects on reproduction, fertility, fetal development, birth defects, and offspring growth and development before a pesticide is registered. Some older pesticides, including some listed in Table 1, are being reevaluated by US-EPA. The Endocrine Disruptor Screening and Testing Advisory Committee is revising US-EPA's testing guidelines for evaluating effects on reproduction and fetal development, which should increase ability to detect hormone-disrupting effects. This committee, which includes independent scientists and industry reps, has a report deadline of June 1998.

There is current debate on whether the higher-dose, short-term studies that US-EPA currently requires for pesticide registration are applicable to low-dose, long-term exposures that wildlife and humans are likely to experience once a pesticide is registered. This issue becomes stronger when endocrine disruptors are involved. With both dicofol in Lake Apopka and dioxin and PCBs in the Great Lakes, the levels of these chemicals in the water is within approved standards and near or below normal detectable levels. Yet predators near the top of the food chain (alligators, lake trout, herring gulls) are affected through biomagnification.

Biomagnification allows some chemicals, particularly fat-soluble ones, to be retained in the body rather than excreted. This retention continues as many individuals are eaten by predators who themselves are eaten by predators. By working through several levels of predators (trophic levels), the chemical that was consumed initially in exceedingly small amounts becomes concentrated in a top predator. Add to this scenario that hormones, and endocrine disruptors, cause major effects in exceedingly small amounts, and there is the p potential for major effects to wildlife and humans caused by very small amounts in the environment.

Although several industrial chemicals and no-longer-registered pesticides appear to be more important as endocrine disruptors at this time, several labeled pesticides also appear to be involved. As the research, debate, and rule-making continue, the picture should become clearer.

The summary offered here is based primarily on the following: presentations at the National Pesticide Applicator Certification and Training Workshop in Columbus, Ohio, on June 12, 1997, and the National Endocrine Disruptors Conference in Chicago, Illinois, on July 14, 1997; the publications *Our Stolen Future* by Theo Colborn, Dianne Dumanoski, and John Peterson Myers (1997), *Endocrine Disruptors Strategy by Illinois EPA* (1997), *Pesticide & Toxic Chemical News* (Oct. 22, 1997), and *Questions & Answers: Potential of Chemicals to Affect the Endocrine System* by USEPA (1996) were also used.

(Phil Nixon)

National PAT Conference—Additional Perspectives

Last issue we covered the Sixth National Pesticide Applicator Certification and Training Workshop held June 9 to 12 in Columbus, Ohio. In that article, I provided my take-home message. Here are two more personal take-home messages providing the Private Pesticide Applicator Training–perspective. Bruce Paulsrud coordinates the PPAT program in Illinois, and Bill Brink conducts numerous PPAT programs each year.

Bruce Paulsrud, Extension plant pathologist: I was impressed with the wide variety of sessions available. High technology, or low, there was something for everyone. To me, the most memorable and valuable session was entitled "Private Applicator Training—Where Is It Headed?" Seven county agents from five different states discussed their educational programs, shared the challenges they face, and voiced their opinions of what PAT programs should be in the future. Although programs vary considerably from state-to-state, it was an excellent opportunity to generate new ideas. I also witnessed the formation of the *Journal of Pesticide Safety Education (JPSE).* This electronic, peer-reviewed publication will be available on the internet. Now we're cookin' with gas! What a great opportunity to interact with other pesticide safety educators by sharing research, program ideas, techniques, and training material tips! The first issue is scheduled for January 1998. Even if you are not yet a member of the American Association of Pesticide Safety Educators (AAPSE), your are invited to publish in the *JPSE.* For more information, point your Internet browser to **<http://borg.lib.vt.edu/ejournals/JPSE/>**.

Bill Brink, crop systems educator, Springfield Extension Center: Private Pesticide Applicator Training (PPAT) is occurring in most every state, but the methods and procedures vary greatly among states and even among counties within the states. Some states require producers to take and pass the test only once and then compel them to have a minimum number of continuing education units (CEUs) each year or each cycle for recertification. Not every county will offer CEUs in all the required subject-matter areas. Therefore, producers needing specific CEUs in different subject-matter areas may have to attend several meetings at several locations to satisfy their needs. In some cases, those meetings are production-type meetings with specific pesticide and crop recommendations.

The Illinois philosophy regarding PPAT is more on compliance rather than education on specific pesticide recommendations. Illinois producers have to show a knowledge of pesticide safety and handling by passing an examination only once every 3 years. This method seems very adequate to satisfy the training needs of farmers and is much less complicated and more convenient for everyone involved.

(Bruce Paulsrud, Bill Brink, and Rhonda Ferree)

Spotlight on University of Illinois: What's Ailing You (or, Rather, Your Plants)?

You're a pro at your job; you can identify nearly any plant, pest, or plant problem you encounter. And you've seen a lot. However, who do you turn to when the inevitable happens, you're stumped? The University of Illinois Cooperative Extension Service and Plant Clinic are here to help you answer the tough questions.

The University of Illinois Plant Clinic has served as a clearinghouse for plant problems since 1976. Services include plant and insect identification; diagnosis of disease, insect, weed and chemical injury (field crops only); nematode assays, and help with nutrient-related problems, as well as recommendations involving these diagnoses. Microscopic examinations, laboratory culturing, virus assays (performed outside the Plant Clinic), and nematode assays are a few of the techniques used in the clinic. This multidisciplinary venture involves input from specialists in the areas of botany, entomology, forestry, horticulture, mycology, plant pathology, soils, soil fertility, and weed science, as well as others as needed.

It is always best to try first working through plant problems with your local Cooperative Extension Service educators. These folks have a better idea of the local environmental influences such as soil type, weather conditions, or other factors that might influence plant health. Use the Plant Clinic for specialized or unique situations and consultations.

How do you use the Plant Clinic? The first step is collecting the sample. Although the process is often times quite obvious, remember that an unrepresentative or minimal sample (for example, a single leaf) reduces the prospect for an accurate diagnosis. Once you have a representative sample, what is the best way to get it to the clinic? Think about the type of sample you are sending, how long it will take to arrive, and the environmental conditions during its transport. The biggest problem encountered with mailed samples is that they rot during transport because they are sent in a sealed plastic bag. If you have questions regarding sampling or packaging, please call the Plant Clinic for instructions.

One last, and critical step, completing the sample submission form. You may obtain a sample form from your local Extension office or from the Plant Clinic directly. The diagnostician(s) must have a thorough understanding of your plant problem. Describe the site in detail and the environmental conditions preceding the problem as best you can. Photos showing the plant(s) in their environment are greatly appreciated!

The diagnostic fee is $10 for most samples, $15 for specialty tests (for example, soybean cyst nematode, pinewood nematode, or virus test) and $30 for all other nematode tests. Starting in 1998, the diagnostic fee must accompany the sample. You will receive a letter, usually 7 to 10

working days after sample submission, that explains the sample diagnosis and other appropriate information. The Plant Clinic is open from May 1 to September 15 and is located on the South Farms of the Champaign Urbana campus. The address is

Plant Clinic
1401 W. St. Mary's RD
Urbana, IL 61802
(217) 333-0519

(Bruce Paulsrud and Nancy Pataky)

FQPA Update

I recently attended the 2nd Pacific Northwest Pesticide Issues conference held October 22 in Yakima, Washington. The conference was hosted by Washington State University, and the topic of the day was the Food Quality Protection Act (FQPA)—an EPA status update and a discussion of some of the major provisions such as the "Risk Cup" and "Common Mechanisms of Action."

Because a summary of the entire FQPA was published in the August 1996 issue (Vol. 9, No. 3) of this newsletter, I will only discuss some of the FQPA issues here.

Before describing these new provisions, let's consider how the EPA assessed risk and set food residue tolerances before passage of the FQPA in August of 1996. Basically, the EPA assessed pesticide exposures separately by source and did not combine risks from similar sources. For example, although residues of pesticide "A" may be found in a particular food product you eat, the risks from exposure to pesticide "B," a compound with similar impacts on human health, was not considered as part of the total risk. Any risks from pesticide "B" would be considered separately from those of pesticide "A." In other words, the EPA was including only some percentage of your actual exposure to potential health risks from similar sources. Keep in mind that there are (and will continue to be) large safety factors included in the risk-assessment process to offset this limitation. It is relatively rare to find foods with pesticide residues above their legal tolerance level.

The "Risk Cup"

The new "risk cup" provision requires the EPA to combine (aggregate), where applicable, nondietary exposures with dietary exposures and to group compounds that are expected to have similar impacts on human health. A risk cup considers all exposure to a particular pesticide or group of pesticides that a person may experience, not just those in food. There are numerous potential nondietary pesticide exposures, such as drinking water, residential lawns, golf courses, parks, garden plots, ornamental plants, pools, paint and wood preservatives, indoor applications, pet applications, pesticide drift, dust from farm fields, etc. Imagine the task of obtaining all these nondietary exposure estimates. In light of all these additional potential exposures, how would you logically assign a new residue-tolerance level for a food commodity?

Basically, EPA is approaching this question based on the concept that the total level of acceptable risk to a pesticide is represented by the pesticide's reference dose (RfD). The RfD is the level of exposure to a specific pesticide that a person could receive daily for a period of 70 years without significant risk of long-term or chronic, non-cancer health effects. The analogy of a "risk cup" is used to describe aggregate (combined) exposure estimates. Picture a coffee cup: It can accept only a certain amount of coffee, just as it has been determined that a person can safely tolerate a certain amount of risk due to a certain pesticide (that is, the RfD). Each pesticide use contributes some amount of risk to the cup. Start filling! If the cup becomes full before all the risk is added, pesticide uses must be deleted. If the cup has room after all existing risk is added, more pesticide uses may be safely added. What happens when there are no (or limited) estimates for nondietary exposure to a certain pesticide? In such cases, EPA will decide that the cup can be filled to only 80 to 95% of capacity (80 to 95% of the RfD) to conservatively allow for the lack of data. As you can see, collecting this data may increase the "room" in this cup, possibly allowing additional (or saving) pesticide uses. However, collecting nondietary exposure data is not easy; for an example of this type of data collection, consider reading "Lawn Pesticides Tracked Indoors" *(Illinois Pesticide Review,* April 1997, Vol. 10, No. 2).

Common Mechanism of Action

The basic idea of this provision, as eluded to above, is that if two or more active ingredients have the same toxicological endpoint and are structurally similar, the EPA will assume they have a common mechanism of toxicity. Thus, from a risk standpoint, they would share the same risk cup. As you can imagine, certain risk cups will become crowded and overflow very quickly under this provision. During the

conference in Washington, there were a couple of major questions raised regarding this risk assessment approach. First, what exactly, is a "toxicological endpoint" and second, how exactly, is structural similarity evaluated and is it a reliable and appropriate indicator for this purpose?

The organophosphate and carbamate insecticide families provide a good example here, especially because they are at the top of EPA's reregistration decision list. We know that exposure to products in either family affects the nervous system. Is that the toxicological endpoint? If it is, then those products share common mechanisms of toxicity with the pyrethroid insecticides, and all three insecticide families may be placed in the same risk cup. However, we also know that the organophosphate and carbamate insecticides act by binding with an enzyme called acetylcholinesterase, while the pyrethroids do not. Now, from a molecular standpoint, there appears to be justification to combine the organophosphate and carbamate insecticides in one risk cup and the pyrethroids in another. Of course, in all cases, the final decision of whether or not to group will be based on structural similarity.

In many cases, we don't know exactly how a pesticide works in mammalian systems. The EPA is using caution with this provision and will revisit its interim decisions as the scientific knowledge-base grows.

Take-Home Message

As the risk cups overflow, which uses will be lost? Simply stated, pesticides with an overflowing risk cup will likely "shed" the least profitable uses from the label until they are in compliance with the amended laws. What does that mean for minor-crop and minor-use pest management? Consensus at the conference in Washington was that minor crops will lose many important pesticides (particularly insecticides, and to a lesser extent, fungicides). However, there are many provisions in the FQPA amendments that directly address this issue, and there are many new, safer products in the "pipeline." In the meantime, stay tuned and keep yourself informed.

(Bruce E. Paulsrud; additional source, EPA Pesticide Registration Notice No. 97-1)

Pesticide Update

The following information provides registration status of particular pesticides and should not be considered as pesticide recommendations by Illinois Extension.

Agronomic

Dekalbt, DeKalb Genetics
New active ingredient, which is corn that contains the *B.t.* gene.

Dekalb Genetics
The company will be the first to introduce Roundup Ready corn into the market for the 1998 growing season.

Magnate (imazalil), Makhteshim
New trade name for this wheat and barley seed treatment.

V-53482 (flumioxazin), Valent
New soybean broadleaf herbicide to be registered in 1999.

Many

Daza (dihydroazadirachtin), Thermo Trilogy
New active ingredient for indooor and outdoor use on ornamentals, turf, agronomic, and horticultural crops.

Kocide 2000 (copper hydroxide), Griffin
Changed signal word from "danger" to "warning."

Mitac WP (amitraz), AgrEvo
Deleting registration, effective 2-23-98.

Morestan 25% WP (oxythioquinox), Bayer
Deleting registration, effective 2-23-98.

Pentac (dienochlor), Novartis
Due to the high cost of re-registration, this product will be canceled, effective 1-12-98.

Other

Dow Chemical Co.
The company will change the name for its agricultural chemical group from DowElanco to Dow Agro Sciences, effective 1-1-98.

Zeneca
The company will sell its Devrinol (napropamide) business to United Phosphorus.

Structures

Nylor 10EC (pyriproxyfen), MGK Inc.
New product to control cockroaches indoors.

Turf/Ornamental

Central Garden & Pet
This company purchased the insecticides Mavrik and Enstar from Sandoz.

Conserve SC (spinosad), DowElanco
Received EPA registration for use on turf and ornamentals, to control leaf-eating insects.

Cyclocel (chlormequat chloride), American Cyanamid
Added use on marigolds and gardenias.

Cygnus (kresoxim-methyl), BASF
New fungicide for use on ornamentals.

Dimension (dithiopyr), Rohm & Haas
Added over 150 ornamental plants.

Hormodin (IBA), The Geiger Co.
New product, for use on ornamental plants to improve rooting.

Medallion (fludioxinil), Novartis
New product, to control root and stem diseases on ornamental plants.

Sunspray Ultra Fine Oil (petroleum oil), Sun
Added 16 new ornamentals.

Terraclor 75% WP (PCNB), Uniroyal
Added use on vegetable bedding plants and additional ornamentals.

Vegetable/Fruit

Champ Formula 2 (copper hydroxide), Agtrol
Added use on parsley and watermelons.

Comite (propargite), Uniroyal
Added dry lima beans.

Di Terra ES (Myrothecium spp.), *Abbott Labs*
Biopesticide receiving EPA registration to control nematodes on cole crops and grapes.

Lepinox (B.t. *strain EG-7826, Ecogen*
New active ingredient (formerly Crystar), to control lepidoptera insects.

Monitor (methamidophos), Bayer/ Valent
This product will now be marketed on only three crops: cotton, potatoes, and tomatoes.

Omi-88, Mitsubishi
New insecticide for use on cole crops; vegetable and fruit crops.

Ronilan (vinclozolin), BASF
Approved to control white and grey mold on snap beans.

Sovran (kresoxim-methyl), BASF
New fungicide, for use on apples, grapes, pears, and cucurbits.

Terraclor F (PCNB), Uniroyal
Added use on vegetable bedding plants and hot peppers.

(Rhonda Ferree; unless other noted, adapted from Agricultural Chemical News, August 1997, September 1997, and October 1997)

PLANT DISEASES

1997's Most Common Plant Diseases

The Bi-State Horticulture Conference in Moline on November 5 was the rebirth of an annual conference to address the concerns of landscapers in the northern areas of Illinois and Iowa. Among others, I was asked to speak at the conference with my Iowa Plant Clinic counterpart, Paula Flynn. Our topic was the ten most common tree and shrub disease problems in 1997. The diseases we chose to discuss (not in order of importance) were cedar-apple and related rusts, anthracnose, oak wilt, Verticillium wilt, ash decline, Sphaeropsis blight of pine, Rhizosphaera of spruce, Cytospora of spruce, black knot of plum, and environmental or abiotic disease.

Of course, Paula and I had a time limit to consider for our talk, but based on what I saw at the Illinois clinic this year, I would probably add Phytophthora root rot, Phomopsis of juniper, pine wilt, white pine decline, and Dothistroma/brown spot on pine to this list. If you are aware of other diseases that were particularly bothersome, drop me a line and I will make time this winter for literature searches and to prepare material for next year's *Home, Yard and Garden Pest Newsletter*. It is not always possible to do a thorough job researching articles in the midst of the busy clinic season. Send in your ideas now so that we can better serve you. *(Nancy Pataky)*

Changes at the Clinic for 1998

The 1997 season was a good one at the Plant Clinic in terms of sample volume—we handled just over 3,000 samples this year. In terms of turnaround time, it was one of the worst years in the past twenty. Part of the reason for our problems was the timing of the greatest influx of samples. Because of the extended cool, wet spring and early summer, plant problems were thriving for all of June and half of July. Generally the heat of summer slows things down enough that clinic staff can catch up. That never happened this year and we were behind from mid-June to closing.

Action has been taken to try to increase staffing for 1998. Nothing has been promised, but hopes are high for additional help in the areas of plant pathology, entomology, and weed science.

Beginning in 1998 *payment must accompany the samples.* We do not have a separate billing office at the clinic and to institute one would double existing fees. Far too much staff time is spent on billings and associated paperwork. Payment sent with the samples should free up office staff to help decrease turnaround time.

As you know, insect samples were also processed at the clinic this year and will continue for 1998. These samples will be subject to the same $10 fee. Insect samples are handled by entomologists, but the paperwork and letters are processed by clinic staff.

We look forward to a more efficient season in 1998 and encourage any helpful suggests you can offer. Send them to Nancy Pataky at N533 Turner Hall, 1102 S. Goodwin, Urbana, IL 61801 or npataky@uiuc.edu. *(Nancy Pataky)*

Home, Yard and Garden Pest Newsletter *is prepared by Extension specialists from the University of Illinois at Urbana-Champaign and the Illinois Natural History Survey. Information for this newsletter is gathered with the help of staff members, Extension field staff, and others in cooperation with the USDA Animal and Health Inspection Service.*

Major authors are Phil Nixon, (217) 333-6650 and Fredric Miller, (708) 352-0109, entomologists; Nancy Pataky, plant pathologist, (217) 333-0519; Rhonda Ferree, Tom Voigt, and David Williams, horticulturists, (217) 333-0350, and Karel Jacobs, plant pathologist, The Morton Arboretum, (630) 719-5646. Phil Nixon is the executive editor of the Home, Yard and Garden Pest Newsletter. *This newsletter is written by faculty in the Department of Natural Resources and Environmental Sciences and the Department of Crop Sciences.*

Index

Plant Diseases

CES Newsletter Service
University of Illinois at Urbana-Champaign
69 Mumford Hall
1301 West Gregory Drive
Urbana, IL 61801

Return Service Requested

19980131
Ag Library Serials Clerk
226 Mumford Hall
1301 W Gregory Dr
CAMPUS MAIL
MC-710